

70166USNP.ST25
SEQUENCE LISTING

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Patton, David
Frye, Catherine

<120> Nucleic Acid Molecules Encoding Proteins Essential for Plant Growth and Development and Uses Thereof

<130> 70166USNP

<150> US 60/423,519
<151> 2002-11-04

<160> 73

<170> PatentIn version 3.1

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565

570

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gaa atg tgg gtt tct ctc ctc gac aat gta ccg gat aat gaa tgg agc Glu Met Trp Val Ser Leu Leu Asp Asn Val Pro Asp Asn Glu Trp Ser 645 650 655	1968
atg agc aag att gtc agt aca ttg gtg gct aac aaa gag tat gca gac Met Ser Lys Ile Val Ser Thr Leu Val Ala Asn Lys Glu Tyr Ala Asp 660 665 670	2016
aag atg ctc agc tat gcc gaa aat cac aac caa tcc ata tca gga ggg Lys Met Leu Ser Tyr Ala Glu Asn His Asn Gln Ser Ile Ser Gly Gly 675 680 685	2064
cgt tca ttt gct gaa atc tta ttc ggt gga gtc gat aat ggt tct cct Arg Ser Phe Ala Glu Ile Leu Phe Gly Gly Val Asp Asn Gly Ser Pro 690 695 700	2112
gga gga aaa gaa ttg cta gac agg gga att tca cta cat aag atg att Gly Gly Lys Glu Leu Leu Asp Arg Gly Ile Ser Leu His Lys Met Ile 705 710 715 720	2160
aga ctg att act ttt aca agt ggt ggc cgt gca tac ctc aat ttc atg Arg Leu Ile Thr Phe Thr Ser Gly Gly Arg Ala Tyr Leu Asn Phe Met 725 730 735	2208
gga aat gaa ttt gga cat cct gag agg gtt gag ttt cca acg cag agc Gly Asn Glu Phe Gly His Pro Glu Arg Val Glu Phe Pro Thr Gln Ser 740 745 750	2256
aat aac ttc tcg ttt tca ctt gct aac cgc cgc tgg gac ctg ctg gaa Asn Asn Phe Ser Phe Ser Leu Ala Asn Arg Arg Trp Asp Leu Leu Glu 755 760 765	2304
agt gga gtg cat cat cac ttg ttt tcc ttt gac aag gag cta atg gac Ser Gly Val His His Leu Phe Ser Phe Asp Lys Glu Leu Met Asp 770 775 780	2352
ttg gat aaa agc aag ggt atc ctt tca aga ggt ctg ccc agc atc cac Leu Asp Lys Ser Lys Gly Ile Leu Ser Arg Gly Leu Pro Ser Ile His 785 790 795 800	2400
cat gtg aat gat gca aat atg gtg att tct ttc tca agg ggt cct ttc His Val Asn Asp Ala Asn Met Val Ile Ser Phe Ser Arg Gly Pro Phe 805 810 815	2448
cta ttt atc ttt aac ttc cac cca tca aat tca tat gaa aag tat gat Leu Phe Ile Phe Asn Phe His Pro Ser Asn Ser Tyr Glu Lys Tyr Asp 820 825 830	2496
gtc ggt gta gag gaa gct ggt gaa tat acc atg ata ctg aac tcc gat Val Gly Val Glu Glu Ala Gly Glu Tyr Thr Met Ile Leu Asn Ser Asp 835 840 845	2544
gaa gta aag tat ggg ggt caa ggg att gta aca gaa gac cac tat ctt Glu Val Lys Tyr Gly Gly Gln Gly Ile Val Thr Glu Asp His Tyr Leu 850 855 860	2592
caa cgg tca att agc aag aga att gat ggt caa aga aat tgc tta gag Gln Arg Ser Ile Ser Lys Arg Ile Asp Gly Gln Arg Asn Cys Leu Glu 865 870 875 880	2640
gtg ttt ttg cct agc cgg act gcc caa gtt tac aag ttg acc cgg atc Val Phe Leu Pro Ser Arg Thr Ala Gln Val Tyr Lys Leu Thr Arg Ile	2688

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885

890

895

2700

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<213> *Arabidopsis thaliana*

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Pro Arg Lys Ile Lys Leu Lys Ile Thr Cys Phe Ala Ala Glu Arg Pro
35 40 45

Arg Gln Glu Lys Gln Lys Lys Lys Ser Gln Ser Gln Ser Thr Ser Asp
50 55 60

Ala Glu Ala Gly Val Asp Pro Val Gly Phe Leu Thr Arg Leu Gly Ile
65 70 75 80

Ala Asp Arg Ile Phe Ala Gln Phe Leu Arg Glu Arg His Lys Ala Leu
85 90 95

Lys Asp Leu Lys Asp Glu Ile Phe Lys Arg His Phe Asp Phe Arg Asp
100 105 110

Phe Ala Ser Gly Phe Glu Leu Leu Gly Met His Arg His Met Glu His
115 120 125

Arg Val Asp Phe Met Asp Trp Gly Pro Gly Ser Arg Tyr Gly Ala Ile
130 135 140

Ile Gly Asp Phe Asn Gly Trp Ser Pro Thr Glu Asn Ala Ala Arg Glu
145 150 155 160

Gly Leu Phe Gly His Asp Asp Tyr Gly Tyr Trp Phe Ile Ile Leu Glu
165 170 175

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Asp Lys Leu Arg Glu Gly Glu Glu Pro Asp Glu Leu Tyr Phe Gln Gln
180 185 190

Tyr Asn Tyr Val Asp Asp Tyr Asp Lys Gly Asp Ser Gly Val Ser Ala
195 200 205

Glu Glu Ile Phe Gln Lys Ala Asn Asp Glu Tyr Trp Glu Pro Gly Glu
210 215 220

Asp Arg Phe Ile Lys Asn Arg Phe Glu Val Pro Ala Lys Leu Tyr Glu
225 230 235 240

Gln Met Phe Gly Pro Asn Ser Pro Gln Thr Leu Glu Glu Leu Gly Asp
245 250 255

Ile Pro Asp Ala Glu Thr Arg Tyr Lys Gln Trp Lys Glu Glu His Lys
260 265 270

Asp Asp Pro Pro Ser Asn Leu Pro Pro Cys Asp Ile Ile Asp Lys Gly
275 280 285

Gln Gly Lys Pro Tyr Asp Ile Phe Asn Val Val Thr Ser Pro Glu Trp
290 295 300

Thr Lys Lys Phe Tyr Glu Lys Glu Pro Pro Ile Pro Tyr Trp Leu Glu
305 310 315 320

Thr Arg Lys Gly Arg Lys Ala Trp Leu Gln Lys Tyr Ile Pro Ala Val
325 330 335

Pro His Gly Ser Lys Tyr Arg Leu Tyr Phe Asn Thr Pro Asp Gly Pro
340 345 350

Leu Glu Arg Val Pro Ala Trp Ala Thr Tyr Val Gln Pro Glu Asp Glu
355 360 365

Gly Lys Gln Ala Tyr Ala Ile His Trp Glu Pro Ser Pro Glu Ala Ala
370 375 380

Tyr Lys Trp Lys Tyr Ser Lys Pro Lys Val Pro Glu Ser Leu Arg Ile
385 390 395 400

Tyr Glu Cys His Val Gly Ile Ser Gly Ser Glu Pro Lys Val Ser Thr
405 410 415

Phe Glu Glu Phe Thr Lys Lys Val Leu Pro His Val Lys Arg Ala Gly
420 425 430

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Tyr Asn Ala Ile Gln Leu Ile Gly Val Pro Glu His Lys Asp Tyr Phe
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Thr Val Gly Tyr Arg Val Thr Asn Phe Phe Ala Ala Ser Ser Arg Tyr
450 455 460

Gly Thr Pro Asp Asp Phe Lys Arg Leu Val Asp Glu Ala His Gly Leu
465 470 475 480

Gly Leu Leu Val Phe Leu Asp Ile Val His Ser Tyr Ala Ala Asp
485 490 495

Gln Met Val Gly Leu Ser Leu Phe Asp Gly Ser Asn Asp Cys Tyr Phe
500 505 510

His Tyr Gly Lys Arg Gly His His Lys His Trp Gly Thr Arg Met Phe
515 520 525

Lys Tyr Gly Asp Leu Asp Val Leu His Phe Leu Ile Ser Asn Leu Asn
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Trp Trp Ile Thr Glu Tyr Gln Val Asp Gly Tyr Gln Phe His Ser Leu
545 550 555 560

Ala Ser Met Ile Tyr Thr His Asn Gly Phe Ala Ser Phe Asn Asn Asp
565 570 575

Leu Asp Asp Tyr Cys Asn Gln Tyr Val Asp Arg Asp Ala Leu Met Tyr
580 585 590

Leu Ile Leu Ala Asn Glu Ile Leu His Val Gln His Pro Asn Ile Ile
595 600 605

Thr Ile Ala Glu Asp Ala Thr Tyr Tyr Pro Gly Leu Cys Glu Pro Val
610 615 620

Ser Gln Gly Gly Leu Gly Phe Asp Tyr Tyr Val Asn Leu Ser Ala Ser
625 630 635 640

Glu Met Trp Val Ser Leu Leu Asp Asn Val Pro Asp Asn Glu Trp Ser
645 650 655

Met Ser Lys Ile Val Ser Thr Leu Val Ala Asn Lys Glu Tyr Ala Asp
660 665 670

Lys Met Leu Ser Tyr Ala Glu Asn His Asn Gln Ser Ile Ser Gly Gly
675 680 685

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Arg Ser Phe Ala Glu Ile Leu Phe Gly Gly Val Asp Asn Gly Ser Pro
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Gly Gly Lys Glu Leu Leu Asp Arg Gly Ile Ser Leu His Lys Met Ile
705 710 715 720

Arg Leu Ile Thr Phe Thr Ser Gly Gly Arg Ala Tyr Leu Asn Phe Met
725 730 735

Gly Asn Glu Phe Gly His Pro Glu Arg Val Glu Phe Pro Thr Gln Ser
740 745 750

Asn Asn Phe Ser Phe Ser Leu Ala Asn Arg Arg Trp Asp Leu Leu Glu
755 760 765

Ser Gly Val His His His Leu Phe Ser Phe Asp Lys Glu Leu Met Asp
770 775 780

Leu Asp Lys Ser Lys Gly Ile Leu Ser Arg Gly Leu Pro Ser Ile His
785 790 795 800

His Val Asn Asp Ala Asn Met Val Ile Ser Phe Ser Arg Gly Pro Phe
805 810 815

Leu Phe Ile Phe Asn Phe His Pro Ser Asn Ser Tyr Glu Lys Tyr Asp
820 825 830

Val Gly Val Glu Glu Ala Gly Glu Tyr Thr Met Ile Leu Asn Ser Asp
835 840 845

Glu Val Lys Tyr Gly Gly Gln Gly Ile Val Thr Glu Asp His Tyr Leu
850 855 860

Gln Arg Ser Ile Ser Lys Arg Ile Asp Gly Gln Arg Asn Cys Leu Glu
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Val Phe Leu Pro Ser Arg Thr Ala Gln Val Tyr Lys Leu Thr Arg Ile
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195 200 205	
ctc atc gat gca agt gtt cct cct cag aag att gat ctt gat tgt gct	672
Leu Ile Asp Ala Ser Val Pro Pro Gln Lys Ile Asp Leu Asp Cys Ala	
210 215 220	
aat tgg ctt ggt cgc aac aat gta ccg atg act ttc gtg ttt acg aaa	720
Asn Trp Leu Gly Arg Asn Asn Val Pro Met Thr Phe Val Phe Thr Lys	
225 230 235 240	
tgc gat aaa atg aaa gca acg aaa ggg aaa aga cct gat gag aac att	768
Cys Asp Lys Met Lys Ala Thr Lys Gly Lys Arg Pro Asp Glu Asn Ile	
245 250 255	
aaa gct ttc caa caa atc att aga gag aat ttt aaa gta cat cct cct	816
Lys Ala Phe Gln Gln Ile Ile Arg Glu Asn Phe Lys Val His Pro Pro	
260 265 270	
tgg att ttg acg agt agt gta tct ggt tta ggc aga gac gag ctt ctt	864
Trp Ile Leu Thr Ser Ser Val Ser Gly Leu Gly Arg Asp Glu Leu Leu	
275 280 285	
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Pro Asn Phe Ile Ser Ile Pro Lys Ile Ser Ala Ser Thr Asn Asn Pro	
35 40 45	

Thr Thr Thr Asn Arg Ser Ile Ser Asp Ala Thr Lys Phe Ala Lys	
50 55 60	

Ser Val Leu Phe Ile Pro Pro Gly Val Glu Ile Glu Glu Leu Thr Asp	
65 70 75 80	

Asp Met Val Leu Pro Gly Ser Asn Ile Val Ile Gly Pro Phe Ala Gly	
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85

90

95

His Ser Gln Ile Lys Glu Val Glu Phe Val Lys Ser Ser Ala Arg Ala
100 105 110

Arg Asp Cys Pro Lys Asp Asp Arg Pro Glu Ile Ala Ile Leu Gly Arg
115 120 125

Ser Asn Val Gly Lys Ser Ser Leu Ile Asn Cys Leu Val Arg Lys Lys
130 135 140

Glu Val Ala Leu Thr Ser Lys Lys Pro Gly Lys Thr Gln Leu Ile Asn
145 150 155 160

His Phe Leu Val Asn Lys Ser Trp Tyr Ile Val Asp Leu Pro Gly Tyr
165 170 175

Gly Phe Ala Lys Val Ser Asp Ala Ala Lys Thr Asp Trp Ser Ala Phe
180 185 190

Thr Lys Gly Tyr Phe Leu Asn Arg Asp Ser Leu Val Cys Val Leu Leu
195 200 205

Leu Ile Asp Ala Ser Val Pro Pro Gln Lys Ile Asp Leu Asp Cys Ala
210 215 220

Asn Trp Leu Gly Arg Asn Asn Val Pro Met Thr Phe Val Phe Thr Lys
225 230 235 240

Cys Asp Lys Met Lys Ala Thr Lys Gly Lys Arg Pro Asp Glu Asn Ile
245 250 255

Lys Ala Phe Gln Gln Ile Ile Arg Glu Asn Phe Lys Val His Pro Pro
260 265 270

Trp Ile Leu Thr Ser Ser Val Ser Gly Leu Gly Arg Asp Glu Leu Leu
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Leu His Met Ser Gln Leu Arg Asn Tyr Trp Asp Gln
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act tcc gcc ggc ggt cct ccc gtc tct cta ttc cgc cac cgt att cag			96
Thr Ser Ala Gly Gly Pro Pro Val Ser Leu Phe Arg His Arg Ile Gln			
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cgc ctc aga gct tct cat ctc cgt gaa ttc tcg aaa tta cgt tta aat			144
Arg Leu Arg Ala Ser His Leu Arg Glu Phe Ser Lys Leu Arg Leu Asn			
35 40 45			
ttt cca cta atc cgc gcg gat agg cgg ttt ctc gga aat agt gat gct			192
Phe Pro Leu Ile Arg Ala Asp Arg Arg Phe Leu Gly Asn Ser Asp Ala			
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Pro Ser Cys Ser Thr Cys Ile His Ser Leu Val Glu Ser Val Ser Glu			
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gag ctc gaa tcc atc agc aga cgc aag gga agc cga atg aga gtt cgc			288
Glu Leu Glu Ser Ile Ser Arg Arg Lys Gly Ser Arg Met Arg Val Arg			
85 90 95			
gcc agt gta aag gtg aaa tta aca agc tac gga gag gtt cta gag gat			336
Ala Ser Val Lys Val Lys Leu Thr Ser Tyr Gly Glu Val Leu Glu Asp			
100 105 110			
aag cta gta aac cag gag cta gag gct ggt ttg ctt ctg gag ttt aag			384
Lys Leu Val Asn Gln Glu Leu Glu Ala Gly Leu Leu Leu Glu Phe Lys			
115 120 125			
aag gac gca gac aga gtg ttg ttg gca gtt ctt cat aga cgt gat ggc			432
Lys Asp Ala Asp Arg Val Leu Leu Ala Val Leu His Arg Arg Asp Gly			
130 135 140			
aag aag aat tgg atg gtg ttt gat cag aat ggt gtt agt tgt tcc atc			480
Lys Lys Asn Trp Met Val Phe Asp Gln Asn Gly Val Ser Cys Ser Ile			
145 150 155 160			
aaa cca cag caa att aca tac atc gtc ccg aat gtt tat aat ttt gat			528
Lys Pro Gln Gln Ile Thr Tyr Ile Val Pro Asn Val Tyr Asn Phe Asp			
165 170 175			
cat aca gga ctt act gat ttt ctc caa agg gct caa gat aac ttg gat			576
His Thr Gly Leu Thr Asp Phe Leu Gln Arg Ala Gln Asp Asn Leu Asp			
180 185 190			
ccc caa ctg ctt gag ttt gct tgg atg gag tta ctt gag aag aac aaa			624
Pro Gln Leu Leu Glu Phe Ala Trp Met Glu Leu Leu Glu Lys Asn Lys			

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cct gtg acc cca gaa gag tta gca gag atg ata tat ggt cgc gca gat Pro Val Thr Pro Glu Glu Leu Ala Glu Met Ile Tyr Gly Arg Ala Asp			672
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225	230	235	240
tac ttt tct atc ttg gag tca aaa ggt tct cga tca ata tat agc cct Tyr Phe Ser Ile Leu Glu Ser Lys Gly Ser Arg Ser Ile Tyr Ser Pro			768
245	250	255	
cg g cct act gaa cag gtg gaa gag ctt tta cga agg caa cgc gtg aag Arg Pro Thr Glu Gln Val Glu Glu Leu Leu Arg Arg Gln Arg Val Lys			816
260	265	270	
gag gca gaa gat aaa gag ttt cag gag ttt att caa ttg ctg aag tct Glu Ala Glu Asp Lys Glu Phe Gln Glu Phe Ile Gln Leu Leu Lys Ser			864
275	280	285	
gcc aag aag gca cct agt cac gcc aag ccc cct aaa tct tca tgg cta Ala Lys Lys Ala Pro Ser His Ala Lys Pro Pro Lys Ser Ser Trp Leu			912
290	295	300	
gct gat gat aaa gtc caa gat agg att ggc tca ctt gaa gct tat gcc Ala Asp Asp Lys Val Gln Asp Arg Ile Gly Ser Leu Glu Ala Tyr Ala			960
305	310	315	320
att gat gca tgg gca agc act gac cag cag aaa ttg gct gga acg ata Ile Asp Ala Trp Ala Ser Thr Asp Gln Gln Lys Leu Ala Gly Thr Ile			1008
325	330	335	
tta aaa tcc atg ggg tta cag aaa acg tct gta tca gca cta aac ctt Leu Lys Ser Met Gly Leu Gln Lys Thr Ser Val Ser Ala Leu Asn Leu			1056
340	345	350	
ctc ata gat att gga tat ttt cct gta cat gtc aat ctt gaa ctg ctt Leu Ile Asp Ile Gly Tyr Phe Pro Val His Val Asn Leu Glu Leu Leu			1104
355	360	365	
aag ctg aat ctt cca acc cac cac tca gaa gct atc act gaa gct gct Lys Leu Asn Leu Pro Thr His His Ser Glu Ala Ile Thr Glu Ala Ala			1152
370	375	380	
gaa gct ctt ctt tca gaa tcg tct gat att gat gcg gtt agg agg att Glu Ala Leu Leu Ser Glu Ser Ser Asp Ile Asp Ala Val Arg Arg Ile			1200
385	390	395	400
gat ctc aca cac ttg aag gtt tat gca att gat gtt gat gag gct gat Asp Leu Thr His Leu Lys Val Tyr Ala Ile Asp Val Asp Glu Ala Asp			1248
405	410	415	
gag ctt gat gat gcc ctc agt gca acg aga ttg cag gat gga cg g ata Glu Leu Asp Asp Ala Leu Ser Ala Thr Arg Leu Gln Asp Gly Arg Ile			1296
420	425	430	
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435	440	445	
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Pro	Thr	Ala	Thr	Tyr	Pro	Met	Phe	Pro	Glu	Lys	Leu	Ala	Met	Glu	Gly
465					470				475					480	
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Met	Ser	Leu	Arg	Gln	Gly	Glu	Asn	Cys	Asn	Ala	Val	Ser	Val	Ser	Val
									485	490			495		
gtc	ctg	cgt	tct	gat	ggc	tgt	att	aca	gaa	tat	tca	gtt	aat	tca	
Val	Leu	Arg	Ser	Asp	Gly	Cys	Ile	Thr	Glu	Tyr	Ser	Val	Asp	Asn	Ser
					500				505				510		
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Ile	Ile	Arg	Pro	Thr	Tyr	Met	Leu	Thr	Tyr	Glu	Ser	Ala	Ser	Glu	Leu
					515			520				525			
ctt	cac	ttt	aac	cta	gaa	gaa	gaa	gct	gaa	ctg	aaa	ttt	ctg	tct	gag
Leu	His	Leu	Asn	Leu	Glu	Glu	Glu	Ala	Glu	Leu	Lys	Leu	Leu	Ser	Glu
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gca	gca	ttc	att	cgc	tct	cag	tgg	cgc	cgt	gaa	cag	ggt	gca	gtg	gac
Ala	Ala	Phe	Ile	Arg	Ser	Gln	Trp	Arg	Arg	Glu	Gln	Gly	Ala	Val	Asp
					545			550			555			560	
aca	act	aca	cta	gaa	act	cgt	atc	aaa	gtt	gtt	aat	cct	gag	aat	cca
Thr	Thr	Thr	Leu	Glu	Thr	Arg	Ile	Lys	Val	Val	Asn	Pro	Glu	Asp	Pro
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gaa	cct	ttt	ata	aat	ctc	tat	gta	gaa	aat	cag	gca	gat	cta	gcg	atg
Glu	Pro	Leu	Ile	Asn	Leu	Tyr	Val	Glu	Asn	Gln	Ala	Asp	Leu	Ala	Met
					580			585			590				
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Arg	Leu	Val	Phe	Glu	Met	Met	Ile	Leu	Cys	Gly	Glu	Val	Val	Ala	Thr
					595			600			605				
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Phe	Gly	Ser	Gln	His	Asn	Ile	Pro	Leu	Pro	Tyr	Arg	Gly	Gln	Pro	Gln
					610			615			620				
tca	aat	att	gat	gta	tct	gca	ttt	gcg	cat	ctt	cca	gaa	gga	cca	gta
Ser	Asn	Ile	Asp	Val	Ser	Ala	Phe	Ala	His	Leu	Pro	Glu	Gly	Pro	Val
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cgt	tcc	tca	tcc	att	gtc	aaa	gta	atg	cgt	gct	gca	gaa	atg	aat	ttc
Arg	Ser	Ser	Ser	Ile	Val	Lys	Val	Met	Arg	Ala	Ala	Glu	Met	Asn	Phe
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Arg	Cys	Pro	Val	Arg	His	Gly	Val	Leu	Gly	Ile	Pro	Gly	Tyr	Val	Gln
					660			665			670				
ttc	acg	tct	ccc	att	cgt	cga	tac	atg	gat	ctt	act	gca	cac	tat	cag
Phe	Thr	Ser	Pro	Ile	Arg	Arg	Tyr	Met	Asp	Leu	Thr	Ala	His	Tyr	Gln
					675			680			685				
att	aaa	gct	ttt	ctt	cga	gga	ggt	gac	aat	ttt	cca	ttc	tct	gct	ggt
Ile	Lys	Ala	Phe	Leu	Arg	Gly	Gly	Asp	Asn	Phe	Pro	Phe	Ser	Ala	Gly
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aga aga cag gaa aag ggt aaa aag tac acc gca ttg gtc ttg aga ttt Arg Arg Gln Glu Lys Gly Lys Tyr Thr Ala Leu Val Leu Arg Phe 740 745 750	2256
gtc aaa gac cgg atc gca tcc ctt ttg ttg gtt gag gtg ggt ttt caa Val Lys Asp Arg Ile Ala Ser Leu Leu Leu Val Glu Val Gly Phe Gln 755 760 765	2304
gca acg gcg tgg gtg tca gaa gga aaa caa gtg gga gat gaa atc gaa Ala Thr Ala Trp Val Ser Glu Gly Lys Gln Val Gly Asp Glu Ile Glu 770 775 780	2352
gtt cga gta gaa gaa gct cat ccc cgc gac gat ctt att ctc ttc aaa Val Arg Val Glu Glu Ala His Pro Arg Asp Asp Leu Ile Leu Phe Lys 785 790 795 800	2400
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35 40 45

Phe Pro Leu Ile Arg Ala Asp Arg Arg Phe Leu Gly Asn Ser Asp Ala
50 55 60

Pro Ser Cys Ser Thr Cys Ile His Ser Leu Val Glu Ser Val Ser Glu
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Glu Leu Glu Ser Ile Ser Arg Arg Lys Gly Ser Arg Met Arg Val Arg
85 90 95

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Ala Ser Val Lys Val Lys Leu Thr Ser Tyr Gly Glu Val Leu Glu Asp
100 105 110

Lys Leu Val Asn Gln Glu Leu Glu Ala Gly Leu Leu Leu Glu Phe Lys
115 120 125

Lys Asp Ala Asp Arg Val Leu Leu Ala Val Leu His Arg Arg Asp Gly
130 135 140

Lys Lys Asn Trp Met Val Phe Asp Gln Asn Gly Val Ser Cys Ser Ile
145 150 155 160

Lys Pro Gln Gln Ile Thr Tyr Ile Val Pro Asn Val Tyr Asn Phe Asp
165 170 175

His Thr Gly Leu Thr Asp Phe Leu Gln Arg Ala Gln Asp Asn Leu Asp
180 185 190

Pro Gln Leu Leu Glu Phe Ala Trp Met Glu Leu Leu Glu Lys Asn Lys
195 200 205

Pro Val Thr Pro Glu Glu Leu Ala Glu Met Ile Tyr Gly Arg Ala Asp
210 215 220

Pro Leu Glu Ser Tyr Cys Ala His Phe Leu Leu Ser Gln Asp Glu Ile
225 230 235 240

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Arg Pro Thr Glu Gln Val Glu Glu Leu Leu Arg Arg Gln Arg Val Lys
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Ala Lys Lys Ala Pro Ser His Ala Lys Pro Pro Lys Ser Ser Trp Leu
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Ala Asp Asp Lys Val Gln Asp Arg Ile Gly Ser Leu Glu Ala Tyr Ala
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Ile Asp Ala Trp Ala Ser Thr Asp Gln Gln Lys Leu Ala Gly Thr Ile
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Leu Lys Ser Met Gly Leu Gln Lys Thr Ser Val Ser Ala Leu Asn Leu
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340

345

350

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Lys Leu Asn Leu Pro Thr His His Ser Glu Ala Ile Thr Glu Ala Ala
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Glu Pro Leu Ile Asn Leu Tyr Val Glu Asn Gln Ala Asp Leu Ala Met
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1175	1180	1185		
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675 680 685

Asp Glu Phe Gln Ile Cys Gln Ile Cys Ser Gly Glu Asp Glu Arg Lys
690 695 700

Lys Leu Leu His Cys Ser Glu Cys Asp Lys Leu Phe His Pro Asp Cys
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Val Val Pro Pro Val Ile Asp Leu Pro Ser Glu Ala Trp Ile Cys Phe
725 730 735

Ser Cys Lys Glu Lys Thr Glu Glu Tyr Ile Gln Ala Arg Arg Leu Tyr
740 745 750

Ile Ala Glu Leu Gln Lys Arg Tyr Glu Ala Ala Leu Glu Arg Lys Ser
755 760 765

Lys Ile Ile Glu Ile Ile Arg Ser Leu Asn Leu Pro Asn Asn Pro Leu
770 775 780

Asp Asp Ile Val Asp Gln Leu Gly Gly Pro Glu Lys Val Ala Glu Met
785 790 795 800

Thr Gly Arg Arg Gly Met Leu Val Arg Ala Ser Asn Gly Lys Gly Val
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Thr Tyr Gln Ala Arg Asn Thr Lys Asp Ile Thr Met Glu Met Val Asn
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Met His Glu Lys Gln Leu Phe Met Asp Gly Lys Lys Leu Val Ala Ile
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Ile Ser Glu Ala Gly Ser Ala Gly Val Ser Leu Gln Ala Asp Arg Arg
850 855 860

Ala Val Asn Gln Lys Arg Arg Val His Leu Thr Leu Glu Leu Pro Trp
865 870 875 880

Ser Ala Asp Arg Ala Ile Gln Gln Phe Gly Arg Thr His Arg Ser Asn
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Gln Thr Ser Ala Pro Glu Tyr Arg Leu Leu Phe Thr Asn Leu Gly Gly
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Glu Arg Arg Phe Ala Ser Ile Val Ala Lys Arg Leu Glu Thr Leu Gly
915 920 925

Ala Leu Thr Gln Gly Asp Arg Arg Ala Gly Pro Ser Gly Pro Ser Leu
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Ser Ala Tyr Asn Tyr Asp Ser Asn Phe Gly Lys Lys Ser Leu Met Val
945 950 955 960

Met Tyr Arg Gly Ile Met Glu Gln Glu Lys Leu Pro Val Leu Pro Pro
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Gly Cys Ser Ile Asp Glu Pro Glu Thr Val Lys Glu Phe Leu Thr Lys
980 985 990

Ala Arg Ala Ala Leu Val Ala Val Gly Ile Val Arg Asp Ser Val Leu
995 1000 1005

Ala Asn Gly Lys Asp Val Gly Arg Phe Ser Gly Arg Ile Ile Asp
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Ser Asp Met His Asp Val Gly Arg Phe Leu Asn Arg Leu Leu Gly
1025 1030 1035

Leu Pro Pro Asp Ile Gln Asn Arg Leu Phe Glu Leu Phe Thr Ser
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Asp Ser Gly Ile Val Asp Met Lys Ala Asn Ser Val Glu Leu Leu
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Ser Thr Pro Lys Thr Val His Val Asp Gln Met Ser Gly Ala Ser
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Thr Met Leu Phe Thr Phe Thr Leu Asp Arg Gly Val Thr Trp Glu
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Ser Ala Ser Ser Met Leu Glu Gly Lys Arg Arg Asp Gly Leu Gly
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Ser Ala Asn Asp Gly Phe Phe Glu Ser Lys Arg Glu Trp Leu Gly
 1130 1135 1140

Arg Arg His Phe Ile Leu Ala Phe Glu Ser Ala Ala Ser Gly Leu
 1145 1150 1155

Phe Lys Ile Val Arg Pro Ala Val Gly Glu Ser Ile Arg Glu Met
 1160 1165 1170

Ser Leu Ser Glu Leu Lys Thr Lys Tyr Arg Lys Leu Ser Ser Leu
 1175 1180 1185

Glu Lys Ala Arg Thr Gly Trp Glu Asp Glu Tyr Glu Val Ser Ser
 1190 1195 1200

Lys Gln Cys Met His Gly Pro Lys Cys Lys Leu Gly Glu Tyr Cys
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Thr Val Gly Arg Arg Ile Gln Glu Val Asn Val Val Gly Gly Leu
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Ile Leu Pro Ile Trp Gly Thr Ile Glu Lys Ala Leu Ser Lys Gln
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Ala Arg His Ser His Lys Arg Ile Arg Val Ile Arg Ile Glu Thr
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Thr Thr Asp Asn Gln Arg Ile Val Gly Leu Ser Ile Pro Asn Ala
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Trp Ser Ser Pro Thr Trp Thr Arg Gly Leu Cys Leu Lys Arg Pro Val	
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acg aca gtg cac ttt gtt gag agg aaa gat aag cat tta cga ttg aag	144
Thr Thr Val His Phe Val Glu Arg Lys Asp Lys His Leu Arg Leu Lys	
35 40 45	

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Gln Lys Cys Cys Phe Ser Leu Gly Ser Pro Cys Asn Gly Gly Leu Arg	
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gca aaa cct ttc aga gtt aca tct ttt aaa ggt ggc atc caa aat aat	240
Ala Lys Pro Phe Arg Val Thr Ser Phe Lys Gly Gly Ile Gln Asn Asn	
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gaa tca gga gga agt gag ggt ggg aag aaa gtt act aat aac tct gtc	288
Glu Ser Gly Gly Ser Glu Gly Lys Lys Val Thr Asn Asn Ser Val	
85 90 95	

aaa cta tct tac cgt tca gat gat gac gaa aat aat gtg aat ggc tcc	336
Lys Leu Ser Tyr Arg Ser Asp Asp Asp Glu Asn Asn Val Asn Gly Ser	
100 105 110	

cca aag gca cag aac act tcg ttt tca tat acc tcg gaa aca gag gat	384
Pro Lys Ala Gln Asn Thr Ser Phe Ser Tyr Thr Ser Glu Thr Glu Asp	
115 120 125	

tcc atg aca ggg caa ccc gct att cag aaa cta ttc aag aaa tgg ttg	432
Ser Met Thr Gly Gln Pro Ala Ile Gln Lys Leu Phe Lys Lys Trp Leu	
130 135 140	

aca ttg ttg cgc aca cag tca cct att caa gtg att gac gag act tta	480
Thr Leu Leu Arg Thr Gln Ser Pro Ile Gln Val Ile Asp Glu Thr Leu	
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gga gga gaa cag gtt cca caa acg acg aag caa gaa act gaa aca gaa	528
Gly Gly Glu Gln Val Pro Gln Thr Thr Lys Gln Glu Thr Glu Thr Glu	
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Trp	Phe	Trp	Ser	Leu	Asp	Ala	Ala	Ile	Lys	Ile	Pro	Leu	Leu	Leu	Phe		
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Val	Pro	Ala	Phe	Leu	Ala	Val	Tyr	Ala	Ile	Cys	Gly	Ala	Glu	Val	Thr		
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Lys	Glu	Leu	Ser	Pro	Met	Trp	Val	Val	Gly	Pro	Leu	Ile	Ile	Ala	Leu		
225					230				235			240					
tat	ata	aaa	atg	ttc	caa	gga	cta	tgt	tcc	ctt	tac	gcc	ttc	tgc	ttc		768
Tyr	Ile	Lys	Met	Phe	Gln	Gly	Leu	Cys	Ser	Leu	Tyr	Ala	Phe	Cys	Phe		
245					250				255								
aac	caa	acc	atc	aaa	atg	ata	aga	aac	cta	cca	tcg	tat	tat	ctt	gta		816
Asn	Gln	Thr	Ile	Lys	Met	Ile	Arg	Asn	Leu	Pro	Ser	Tyr	Tyr	Leu	Val		
260					265				270								
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Ala	Tyr	Gln	Tyr	Ile	Ala	Asp	Gly	Lys	Leu	Lys	Asp	Asp	Val	Lys	Ala		
275					280				285								
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Leu	Val	Phe	Lys	Pro	Val	Val	Ala	Ile	Lys	Asn	Thr	Asp	Tyr	Lys	Glu		
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Tyr	Leu	Asp	Phe	Val	Glu	Ser	Val	Trp	Pro	Tyr	Tyr	Cys	Arg	Thr	Ile		
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Ala Lys Pro Phe Arg Val Thr Ser Phe Lys Gly Gly Ile Gln Asn Asn
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Glu Ser Gly Gly Ser Glu Gly Lys Lys Val Thr Asn Asn Ser Val
85 90 95

Lys Leu Ser Tyr Arg Ser Asp Asp Glu Asn Asn Val Asn Gly Ser
100 105 110

Pro Lys Ala Gln Asn Thr Ser Phe Ser Tyr Thr Ser Glu Thr Glu Asp
115 120 125

Ser Met Thr Gly Gln Pro Ala Ile Gln Lys Leu Phe Lys Lys Trp Leu
130 135 140

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145 150 155 160

Gly Gly Glu Gln Val Pro Gln Thr Thr Lys Gln Glu Thr Glu Thr Glu
165 170 175

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180 185 190

Trp Phe Trp Ser Leu Asp Ala Ala Ile Lys Ile Pro Leu Leu Phe
195 200 205

Val Pro Ala Phe Leu Ala Val Tyr Ala Ile Cys Gly Ala Glu Val Thr
210 215 220

Lys Glu Leu Ser Pro Met Trp Val Val Gly Pro Leu Ile Ile Ala Leu
225 230 235 240

Tyr Ile Lys Met Phe Gln Gly Leu Cys Ser Leu Tyr Ala Phe Cys Phe
245 250 255

Asn Gln Thr Ile Lys Met Ile Arg Asn Leu Pro Ser Tyr Tyr Leu Val
260 265 270

Ala Tyr Gln Tyr Ile Ala Asp Gly Lys Leu Lys Asp Asp Val Lys Ala

275

280

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285

Leu Val Phe Lys Pro Val Val Ala Ile Lys Asn Thr Asp Tyr Lys Glu
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Leu Thr Arg Thr Lys Leu Lys Gln Phe Gln Glu Trp Ile Ile Glu Lys
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Thr Leu Phe Thr Val Phe Gly Ser Gly Ser Phe Trp Ile Leu Trp Ala	
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gtt aat tgg cgg cca tgg cgt ctc tac agt tgg atc ttt gct aga aaa	144
Val Asn Trp Arg Pro Trp Arg Leu Tyr Ser Trp Ile Phe Ala Arg Lys	
35 40 45	

tgg cca aaa gta ttg caa ggt cct cag ctt gat ata cta tgt ggt gtt	192
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Ile	Gly	Trp	Gly	Ser	Trp	Leu	Ile	Val	Ile	Leu	Asp	Arg	His	Ile	Ile	
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ggg	ctg	gcg	ata	ata	atg	gct	gga	rca	gcc	ctt	tta	ctg	gca	ttc	tac	336
Gly	Leu	Ala	Ile	Ile	Met	Ala	Gly	Xaa	Ala	Leu	Leu	Leu	Ala	Phe	Tyr	
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Ser	Ile	Met	Leu	Trp	Trp	Arg	Thr	Gln	Trp	Gln	Ser	Ser	Arg	Ala	Val	
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Cys	Ala	Val	Tyr	Val	Thr	Ala	Gly	Ala	His	Ala	Ser	Gln	Gln	Tyr	Ser	
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Pro	Ser	Gly	Phe	Phe	Gly	Val	Ser	Ala	Ile	Ala	Leu	Ala	Ile	Asn		
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atg	cta	ttt	atc	tgc	cgc	atg	gtc	ttt	aat	gga	aat	ggt	tta	gat	gtg	576
Met	Leu	Phe	Ile	Cys	Arg	Met	Val	Phe	Asn	Gly	Asn	Gly	Leu	Asp	Val	
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Glu	Val	Gly	Pro	Val	Ala	Cys	Leu	Pro	Glu	Pro	Pro	Asp	Pro	Asn	Glu	
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Leu	Gly	Ser	Leu	Val	Leu	Leu	Ala	Tyr	Ser	Val	Leu	Tyr	Gly	Leu		
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Ile	Val	Leu	Asp	Trp	Asn	Ile	Gly	Ala	Cys	Leu	Tyr	Gly	Phe	Lys	Leu	
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Leu	Gln	Asn	Arg	Val	Leu	Ala	Leu	Phe	Val	Ala	Gly	Ile	Ser	Arg	Leu	
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Ser Tyr Ile Phe Val Ala Ser Val Leu Ser Gly Ala Ala Val Ser Arg		
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His Leu Ser Ile Thr Asp Pro Ser Ala Ala Arg Arg Asp Ala Leu Gln		
340 345 350		
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Ser Thr Val Ile Arg Leu Arg Glu Gly Phe Arg Arg Lys Glu Gln Asn		
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Thr Ala Glu Ser Cys Thr Ala Asp Asn Leu Thr Arg Thr Gly Ser Ser		
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Leu Gly Leu Arg Ser Ser Ser Cys Arg Ser Val Val Gln Glu Pro Glu		
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Ala Gly Thr Ser Tyr Phe Met Asp Lys Val Ser Asp Gln Asn Asn Thr		
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Leu Val Val Cys Ser Ser Ser Gly Leu Asp Ser Gln Gly Tyr Glu Ser		
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Ser Thr Ser Asn Ser Ala Asn Gln Gln Leu Leu Asp Met Asn Leu Ala		
485 490 495		
ctt gct ttc cag gac cag tta aac aat cct agg ata gcc tcg ata ctt		1536
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Lys Lys Lys Xaa Lys Glu Gly Asp Leu Glu Leu Thr Asn Leu Leu Gln		
515 520 525		
gac aag ggg ttg gac cct aac ttt gct gta atg ttg aag gaa aaa aac		1632
Asp Lys Gly Leu Asp Pro Asn Phe Ala Val Met Leu Lys Glu Lys Asn		
530 535 540		
ttg gat cct gga aaa aac ttg ggt ctn act ata ttg gca cta ctt cag		1680
Leu Asp Pro Gly Lys Asn Leu Gly Xaa Thr Ile Leu Ala Leu Leu Gln		
545 550 555 560		

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gtt gga ttg tca ctc tcg ttc ttg agt aaa tcg tca gta ctt ctg gga Val Gly Leu Ser Leu Ser Phe Leu Ser Lys Ser Ser Val Leu Leu Gly 705 710 715 720	2160
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810

815

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gga act tca tat ttg gaa gtt gta aaa tct aga gat gat cag ttg ccc Gly Thr Ser Tyr Leu Glu Val Val Lys Ser Arg Asp Asp Gln Leu Pro 865 870 875 880	2640
aca aag ggt gat ttc ctt gcg gcc ttg ctt cca ctt gca tgc att ccg Thr Lys Gly Asp Phe Leu Ala Ala Leu Leu Pro Leu Ala Cys Ile Pro 885 890 895	2688
gcg ctg ctt tca cta tgc tgt ggg atg gtt aaa ttg aag gac gat tgt Ala Leu Leu Ser Leu Cys Cys Gly Met Val Lys Trp Lys Asp Asp Cys 900 905 910	2736
tgg ata ctc tct cga ggt gta tat gtt ttc ttt tca ata ggt ctt ctt Trp Ile Leu Ser Arg Gly Val Tyr Val Phe Phe Ser Ile Gly Leu Leu 915 920 925	2784
ctt ctt ttt ggt gcg ata gca gct gtc att gca gtc aaa cca ttg acg Leu Leu Phe Gly Ala Ile Ala Ala Val Ile Ala Val Lys Pro Trp Thr 930 935 940	2832
ata ggc gta tct ttt ctc tta gtt ctt ttc ctt atg gtg gta aca att Ile Gly Val Ser Phe Leu Leu Val Leu Phe Leu Met Val Val Thr Ile 945 950 955 960	2880
ggt gta atc cat ctt tgg gcg tca aac aat ttc tat tta acc agg aaa Gly Val Ile His Leu Trp Ala Ser Asn Asn Phe Tyr Leu Thr Arg Lys 965 970 975	2928
cag aca tcc ttt gtc tgc ttt ctt gct ctt ttg ggt ttg gcc gca Gln Thr Ser Phe Val Cys Phe Leu Ala Leu Leu Leu Gly Leu Ala Ala 980 985 990	2976
ttc ctt ctc gga tgg cat caa gat aaa gca ttt gct gga gca tct gtt Phe Leu Leu Gly Trp His Gln Asp Lys Ala Phe Ala Gly Ala Ser Val 995 1000 1005	3024
ggt tac ttt aca ttc ctg tct ctg ttg gct gga aga gca tta gct Gly Tyr Phe Thr Phe Leu Ser Leu Leu Ala Gly Arg Ala Leu Ala 1010 1015 1020	3069
gtt ctt cta tcc cca cca att gta gta tat tct cca agg gtg cta Val Leu Leu Ser Pro Pro Ile Val Val Tyr Ser Pro Arg Val Leu 1025 1030 1035	3114
cca gta tat gtc tac gat gct cat gct gat tgc gga aag aat gtc Pro Val Tyr Val Tyr Asp Ala His Ala Asp Cys Gly Lys Asn Val 1040 1045 1050	3159
agt gct gca ttt ctt gtc ctg tat gga att gct ttg gca aca gaa	3204

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Ser	Ala	Ala	Phe	Leu	Val	Leu	Tyr	Gly	Ile	Ala	Leu	Ala	Thr	Glu	
1055						1060					1065				
ggc	tgg	ggt	gtt	gtt	gct	agt	ctg	ata	att	tat	cct	ccg	ttt	gct	3249
Gly	Trp	Gly	Val	Val	Ala	Ser	Leu	Ile	Ile	Tyr	Pro	Pro	Phe	Ala	
1070						1075					1080				
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Gly	Ala	Ala	Val	Ser	Ala	Ile	Thr	Leu	Val	Val	Ala	Phe	Gly	Phe	
1085						1090					1095				
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Ala	Val	Ser	Arg	Pro	Cys	Leu	Thr	Leu	Glu	Met	Met	Glu	Val	Ala	
1100						1105					1110				
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Val	Arg	Phe	Leu	Ser	Lys	Asp	Thr	Ile	Val	Gln	Ala	Ile	Ser	Arg	
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Ser	Ala	Thr	Lys	Thr	Arg	Asn	Ala	Leu	Ser	Gly	Thr	Tyr	Ser	Ala	
1130						1135					1140				
ccc	caa	agg	tcc	gcc	agc	tct	gca	gct	ctt	ctg	gtt	ggg	gat	ccc	3474
Pro	Gln	Arg	Ser	Ala	Ser	Ser	Ala	Ala	Leu	Leu	Val	Gly	Asp	Pro	
1145						1150					1155				
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Ser	Ala	Met	Arg	Asp	Lys	Ala	Gly	Asn	Phe	Val	Leu	Pro	Arg	Asp	
1160						1165					1170				
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Asp	Val	Met	Lys	Leu	Arg	Asp	Arg	Leu	Arg	Asn	Glu	Glu	Arg	Val	
1175						1180					1185				
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Ala	Gly	Ser	Ile	Phe	Tyr	Lys	Met	Gln	Cys	Arg	Lys	Gly	Phe	Arg	
1190						1195					1200				
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His	Glu	Pro	Pro	Thr	Asn	Val	Asp	Tyr	Arg	Arg	Asp	Met	Cys	Ala	
1205						1210					1215				
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His	Ala	Arg	Val	Leu	Ala	Leu	Glu	Glu	Ala	Ile	Asp	Thr	Glu	Trp	
1220						1225					1230				
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Val	Tyr	Met	Trp	Asp	Lys	Phe	Gly	Gly	Tyr	Leu	Leu	Leu	Leu	Leu	
1235						1240					1245				
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Gly	Leu	Thr	Ala	Lys	Ala	Glu	Arg	Val	Gln	Asp	Glu	Val	Arg	Leu	
1250						1255					1260				
cgg	ctc	tcc	tta	gat	agc	att	ggg	tcc	tcg	gat	tta	agt	gcc	aga	3834
Arg	Leu	Phe	Leu	Asp	Ser	Ile	Gly	Phe	Ser	Asp	Leu	Ser	Ala	Arg	
1265						1270					1275				
aaa	atc	agt	aaa	tgg	aaag	cca	gag	gat	aga	aga	caa	ttc	gaa	att	3879
Lys	Ile	Ser	Lys	Trp	Lys	Pro	Glu	Asp	Arg	Arg	Gln	Phe	Glu	Ile	
1280						1285					1290				

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Ile	Gln	Glu	Ser	Tyr	Leu	Arg	Glu	Lys	Glu	Met	Glu	Glu	Glu	Ser	
1295					1300					1305					
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Leu	Met	Gln	Arg	Arg	Glu	Glu	Glu	Gly	Arg	Gly	Lys	Glu	Arg	Arg	
1310					1315					1320					
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Lys	Ala	Leu	Leu	Glu	Lys	Glu	Glu	Arg	Lys	Trp	Lys	Glu	Ile	Glu	
1325					1330					1335					
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Ala	Ser	Leu	Ile	Pro	Ser	Ile	Pro	Asn	Ala	Gly	Ser	Arg	Glu	Ala	
1340					1345					1350					
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Ala	Ala	Met	Ala	Ala	Ala	Ile	Arg	Ala	Val	Gly	Gly	Asp	Ser	Val	
1355					1360					1365					
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Leu	Glu	Asp	Ser	Phe	Ala	Arg	Glu	Arg	Val	Ser	Gly	Ile	Ala	Arg	
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Arg	Ile	Arg	Thr	Ala	Gln	Leu	Glu	Arg	Arg	Ala	Gln	Gln	Thr	Gly	
1385					1390					1395					
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Ile	Ser	Gly	Ala	Val	Cys	Val	Leu	Asp	Asp	Glu	Pro	Met	Ile	Ser	
1400					1405					1410					
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Gly	Lys	His	Cys	Gly	Gln	Met	Asp	Ser	Ser	Val	Cys	Gln	Ser	Gln	
1415					1420					1425					
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Lys	Ile	Ser	Phe	Ser	Val	Thr	Ala	Met	Ile	Gln	Ser	Asp	Ser	Gly	
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Pro	Val	Cys	Leu	Phe	Gly	Thr	Glu	Phe	Gln	Lys	Lys	Val	Cys	Trp	
1445					1450					1455					
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Glu	Ile	Leu	Val	Ala	Gly	Ser	Glu	Gln	Gly	Ile	Glu	Ala	Gly	Gln	
1460					1465					1470					
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Val	Gly	Leu	Arg	Leu	Ile	Thr	Lys	Gly	Glu	Arg	Gln	Thr	Thr	Val	
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Ala	Arg	Glu	Trp	Tyr	Ile	Gly	Ala	Thr	Ser	Ile	Thr	Asp	Gly	Arg	
1490					1495					1500					
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Trp	His	Thr	Val	Thr	Ile	Thr	Ile	Asp	Ala	Asp	Ala	Gly	Glu	Ala	
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Thr	Cys	Tyr	Ile	Asp	Gly	Gly	Phe	Asp	Gly	Tyr	Gln	Asn	Gly	Leu	
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cct	cta	agt	att	ggc	agt	gcc	att	tgg	gaa	caa	gga	gct	gaa	gtt		4644
Pro	Leu	Ser	Ile	Gly	Ser	Ala	Ile	Trp	Glu	Gln	Gly	Ala	Glu	Val		
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Trp	Leu	Gly	Val	Arg	Pro	Pro	Ile	Asp	Val	Asp	Ala	Phe	Gly	Arg		
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Ser	Asp	Ser	Asp	Gly	Val	Glu	Ser	Lys	Met	His	Ile	Met	Asp	Val		
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Phe	Leu	Trp	Gly	Lys	Cys	Leu	Ser	Glu	Glu	Glu	Ala	Ala	Ser	Leu		
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His	Ala	Ala	Ile	Gly	Met	Ala	Asp	Leu	Asp	Met	Ile	Asp	Leu	Ser		
1595						1600					1605					
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Asp	Asp	Asn	Trp	Gln	Trp	Thr	Asp	Ser	Pro	Pro	Arg	Val	Asp	Gly		
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Trp	Asp	Ser	Asp	Pro	Ala	Asp	Val	Asp	Leu	Tyr	Asp	Arg	Asp	Asp		
1625						1630					1635					
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Val	Asp	Trp	Asp	Gly	Gln	Tyr	Ser	Ser	Gly	Arg	Lys	Arg	Arg	Ser		
1640						1645					1650					
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Gly	Arg	Asp	Phe	Val	Met	Ser	Val	Asp	Ser	Phe	Ala	Arg	Arg	His		
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Arg	Lys	Pro	Arg	Met	Glu	Thr	Gln	Glu	Asp	Ile	Asn	Gln	Arg	Met		
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cgt	tca	gtt	gag	ttg	gct	gtc	aaa	gaa	gct	ctc	tct	gca	cga	ggt		5094
Arg	Ser	Val	Glu	Leu	Ala	Val	Lys	Glu	Ala	Leu	Ser	Ala	Arg	Gly		
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Asp	Lys	Gln	Phe	Thr	Asp	Gln	Glu	Phe	Pro	Pro	Asn	Asp	Arg	Ser		
1700						1705					1710					
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Leu	Phe	Val	Asp	Thr	Gln	Asn	Pro	Pro	Ser	Lys	Leu	Gln	Val	Val		
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Ser	Glu	Trp	Met	Arg	Pro	Asp	Ser	Ile	Val	Lys	Glu	Asn	Gly	Ser		
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Asp	Ser	Arg	Pro	Cys	Leu	Phe	Ser	Gly	Asp	Ala	Asn	Pro	Ser	Asp		
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1760			1765			1770									
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Ala	Val	Leu	Thr	Glu	Val	Ser	Arg	Ile	Ser	Glu	Val	Ile	Ile	Thr	
1775					1780					1785					
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Pro	Glu	Tyr	Asn	Glu	Glu	Gly	Ile	Tyr	Thr	Val	Arg	Phe	Cys	Ile	
1790					1795					1800					
cag	ggt	gag	tgg	gtt	cct	gtt	gtt	atc	gat	gac	tgg	att	cca	tgt	5454
Gln	Gly	Glu	Trp	Val	Pro	Val	Val	Ile	Asp	Asp	Trp	Ile	Pro	Cys	
1805					1810					1815					
gaa	tca	cct	ggt	aaa	cca	gct	ttt	gct	act	agc	aga	aag	ctc	aat	5499
Glu	Ser	Pro	Gly	Lys	Pro	Ala	Phe	Ala	Thr	Ser	Arg	Lys	Leu	Asn	
1820					1825					1830					
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Glu	Leu	Trp	Val	Ser	Met	Val	Glu	Lys	Ala	Tyr	Ala	Lys	Leu	His	
1835					1840					1845					
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Gly	Ser	Tyr	Glu	Ala	Leu	Glu	Gly	Gly	Leu	Val	Gln	Asp	Ala	Leu	
1850					1855					1860					
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Val	Asp	Leu	Thr	Gly	Gly	Ala	Gly	Glu	Glu	Ile	Asp	Leu	Arg	Ser	
1865					1870					1875					
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Ala	Gln	Ala	Gln	Ile	Asp	Leu	Ala	Ser	Gly	Arg	Leu	Trp	Ser	Gln	
1880					1885					1890					
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Pro	Ser	Gly	Ser	Asp	Val	His	Val	Ser	Ser	Ser	Gly	Ile	Val	Gln	
1910					1915					1920					
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Gly	His	Ala	Tyr	Ser	Val	Leu	Gln	Val	Arg	Glu	Val	Asp	Gly	His	
1925					1930					1935					
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Arg	Leu	Val	Gln	Ile	Arg	Asn	Pro	Trp	Ala	Asn	Glu	Val	Glu	Trp	
1940					1945					1950					
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Asn	Gly	Pro	Trp	Ser	Asp	Ser	Ser	Pro	Glu	Trp	Thr	Asp	Arg	Met	
1955					1960					1965					
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Lys	His	Lys	Leu	Lys	His	Val	Pro	Gln	Ser	Lys	Glu	Gly	Ile	Phe	
1970					1975					1980					
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Trp	Met	Ser	Trp	Gln	Asp	Phe	Gln	Ile	His	Phe	Arg	Ser	Ile	Tyr	
1985					1990					1995					
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Val	Cys	Arg	Val	Tyr	Pro	Arg	Glu	Met	Arg	Tyr	Ser	Val	Asn	Gly	
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Gln	Trp	Arg	Gly	Tyr	Ser	Ala	Gly	Gly	Cys	Gln	Asp	Tyr	Ser	Ser	
2015						2020						2025			
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Trp	His	Gln	Asn	Pro	Gln	Phe	Arg	Leu	Arg	Ala	Thr	Gly	Ser	Asp	
2030						2035					2040				
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Ala	Ser	Leu	Pro	Ile	His	Val	Phe	Ile	Thr	Leu	Thr	Gln	Gly	Val	
2045						2050					2055				
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Gly	Phe	Ser	Arg	Thr	Thr	Pro	Gly	Phe	Arg	Asn	Tyr	Gln	Ser	Ser	
2060						2065					2070				
cat	gat	tca	cag	ttg	ttc	tat	atc	gga	ttg	agg	att	ctt	aaa	act	6264
His	Asp	Ser	Gln	Leu	Phe	Tyr	Ile	Gly	Leu	Arg	Ile	Leu	Lys	Thr	
2075						2080					2085				
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Arg	Gly	Arg	Arg	Ala	Ala	Tyr	Asn	Ile	Phe	Leu	His	Glu	Ser	Val	
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Gly	Gly	Thr	Asp	Tyr	Val	Asn	Ser	Arg	Glu	Ile	Ser	Cys	Glu	Met	
2105						2110					2115				
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Val	Leu	Asp	Pro	Asp	Pro	Lys	Gly	Tyr	Thr	Ile	Val	Pro	Thr	Thr	
2120						2125					2130				
ata	cac	cca	ggg	gaa	gaa	gca	cct	ttt	gtc	ctt	tca	gtc	ttc	aca	6444
Ile	His	Pro	Gly	Glu	Glu	Ala	Pro	Phe	Val	Leu	Ser	Val	Phe	Thr	
2135						2140					2145				
aaa	gca	tcc	att	gtt	ctt	gaa	gct	ttg	tag						6474
Lys	Ala	Ser	Ile	Val	Leu	Glu	Ala								
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<210> 16

<211> 2157

<212> PRT

<213> *Arabidopsis thaliana*

<220>

<221> misc_feature

<222> (105)..(105)

<223> The 'xaa' at location 105 stands for Ala, or Thr.

<220>

<221> misc_feature

<222> (516)..(516)

<223> The 'Xaa' at location 516 stands for Glu, Ala, Gln, or Pro.

<220>

<221> misc_feature

<222> (553)..(553)

<223> The 'Xaa' at location 553 stands for Leu.

<220>

<221> misc_feature

<222> (1659)..(1659)

<223> Xaa= any amino acid

<400> 16

Met	Glu	Gly	Asp	Glu	Arg	Gly	Val	Leu	Leu	Ala	Cys	Val	Ile	Ser	Gly
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Thr	Leu	Phe	Thr	Val	Phe	Gly	Ser	Gly	Ser	Phe	Trp	Ile	Leu	Trp	Ala
			20			25							30		

Val	Asn	Trp	Arg	Pro	Trp	Arg	Leu	Tyr	Ser	Trp	Ile	Phe	Ala	Arg	Lys
		35				40								45	

Trp	Pro	Lys	Val	Leu	Gln	Gly	Pro	Gln	Leu	Asp	Ile	Leu	Cys	Gly	Val
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Leu	Ser	Leu	Phe	Ala	Trp	Ile	Val	Val	Val	Ser	Pro	Ile	Ala	Ile	Leu
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Cys	Ala	Val	Tyr	Val	Thr	Ala	Gly	Ala	His	Ala	Ser	Gln	Gln	Tyr	Ser
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Asp Glu Tyr Val Arg Arg Ala Tyr Lys Phe Ala Tyr Ser Asp Cys Ile
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Glu Val Gly Pro Val Ala Cys Leu Pro Glu Pro Pro Asp Pro Asn Glu
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Phe Leu Ile Cys Phe Gly Ile His Tyr Trp Tyr Leu Gly His Cys Ile
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Ser Tyr Ile Phe Val Ala Ser Val Leu Ser Gly Ala Ala Val Ser Arg
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Thr Ala Glu Ser Cys Thr Ala Asp Asn Leu Thr Arg Thr Gly Ser Ser
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405

410

415

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His Trp Leu Asn His Ser Lys Glu His Cys Leu Val Gly Ile Lys Gly
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Asn Pro Glu Val Asn Arg Asn Ile Asp Thr Asp Val Ile Val Ala Glu
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Val Arg Glu Thr Ser Arg Lys Pro Asp Glu Met Tyr Ala Met Leu Glu
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Arg Ile Met Pro Arg Ala Arg Lys Leu Glu Leu Phe Ala Arg Met His
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Asn Ala His Ala Gly Trp Leu Ser Leu Gly Asn Gln Leu Asn Gly Val
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Tyr Gly Val Asp Pro Thr Pro Lys Ile Leu Asn Asn Leu Arg Lys Lys		
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gaa att caa aaa cac aac cgt aga acc aag cgc gaa acc gag tcc gag		192
Glu Ile Gln Lys His Asn Arg Arg Thr Lys Arg Glu Thr Glu Ser Glu		
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gcg gag gtg tat acg gag gcg cag aaa caa tca atg gag gaa gaa gct		240
Ala Glu Val Tyr Thr Glu Ala Gln Lys Gln Ser Met Glu Glu Glu Ala		
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gat cga ttg gga cgt aaa cag agc tgg aaa caa gct tca gct gtt gtt Asp Arg Leu Gly Arg Lys Gln Ser Trp Lys Gln Ala Ser Ala Val Val 225 230 235 240	720
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ctt gtc cga gct ctc tgg aga gaa ggc aag atc gaa gaa gct gtt gaa Leu Val Arg Ala Leu Trp Arg Glu Gly Lys Ile Glu Glu Ala Val Glu 420 425 430	1296
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675 680 685			
gat tat gta agt gaa cca acg gtc tca aac ctc tca aag tca ttg aaa Asp Tyr Val Ser Glu Pro Thr Val Ser Asn Leu Ser Lys Ser Leu Lys			2112
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705 710 715 720			
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ctg caa gat aca aca atg gaa gat gat aat agt gct aat ggt gaa gct Leu Gln Asp Thr Thr Met Glu Asp Asp Asn Ser Ala Asn Gly Glu Ala			2256
740 745 750			
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Glu Gly Ile Glu Arg Val Lys Leu Lys Glu Leu Val Ser Gly Val Arg
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His Trp Val Tyr Ser Asp Lys Lys Arg Lys His Leu Arg Ser Arg Phe
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Pro Thr Lys Leu Thr Lys Asn Leu Arg Gln Lys Asn Trp Asp Pro Val
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Leu Glu Pro Asp Leu Val Val Tyr Asn Ala Ile Leu Asn Ala Cys Val
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Pro Thr Leu Gln Trp Lys Ala Val Ser Trp Val Phe Val Glu Leu Arg
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His Val Asp Asp Cys Met Ala Ile Phe Gln Tyr Met Lys Asp Lys Cys
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Tyr Gln Thr Met Val Leu Ser Gly Tyr Gln Met Asp Gln Thr Lys His
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Ala Ser Met Leu Ile Glu Ala Ser Arg Ala Gly Lys Trp Ser Leu Leu
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Gln Arg Ala Ile Thr Leu Ile Asn Thr Val Ala Leu Ala Ser Phe Gln
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Ile Ser Glu Glu Glu Trp Thr Asp Leu Phe Glu Glu His Gln Asp Trp
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Leu Thr Gln Asp Asn Leu His Lys Leu Ser Asp His Leu Ile Glu Cys
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Asp Tyr Val Ser Glu Pro Thr Val Ser Asn Leu Ser Lys Ser Leu Lys
690 695 700

Ser Arg Cys Gly Ser Ser Ser Ser Ala Gln Pro Leu Leu Ala Val
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Asp Val Thr Thr Gln Ser Gln Gly Glu Lys Pro Glu Glu Asp Leu Leu
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Leu Gln Asp Thr Thr Met Glu Asp Asn Ser Ala Asn Gly Glu Ala
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Trp Glu Phe Thr Glu Thr Glu Leu Glu Thr Leu Gly Leu Glu Glu Leu
Page 74

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755

760

765

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Pro Arg Asp Pro Asn Phe Val Gly Leu Thr Thr Gln Cys Arg Ser Ile	
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gtc agg agg ttt tgt agt gaa aag att gga agt agt gaa tct agt ggc	288
Val Arg Arg Phe Cys Ser Glu Lys Ile Gly Ser Ser Glu Ser Ser Gly	
85 90 95	

tgg aca gag gag gtt gag tat tta gat gag tcg ggt agt gta cta cac	336
Trp Thr Glu Glu Val Glu Tyr Leu Asp Glu Ser Gly Ser Val Leu His	
100 105 110	

agt ggt aag gga ata aga tca gta gag ccg ggg ctt gat gac cat gta	384
Ser Gly Lys Gly Ile Arg Ser Val Glu Pro Gly Leu Asp Asp His Val	
115 120 125	

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cag tct ttg aag att gtt aaa gag gtt gat gcg gcg ctg agt ctg ttt Gln Ser Leu Lys Ile Val Lys Glu Val Asp Ala Ala Leu Ser Leu Phe 180 185 190	576
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gtc gtg ttg ttt gat ggg ttg aac cag gga agg gat ttt gtt ggg att Val Val Leu Phe Asp Gly Leu Asn Gln Gly Arg Asp Phe Val Gly Ile 210 215 220	672
cag tcg ttg ttt gag gag atg gtt caa gac tcg agt agt cac ggt gat Gln Ser Leu Phe Glu Glu Met Val Gln Asp Ser Ser Ser His Gly Asp 225 230 235 240	720
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Leu Ser Tyr Phe Thr Val Arg Asn Gly Phe Cys Pro Asp Cys Ser Val
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Pro Arg Asp Pro Asn Phe Val Gly Leu Thr Thr Gln Cys Arg Ser Ile
 65 70 75 80

Val Arg Arg Phe Cys Ser Glu Lys Ile Gly Ser Ser Glu Ser Ser Gly
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Trp Thr Glu Glu Val Glu Tyr Leu Asp Glu Ser Gly Ser Val Leu His
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Ser Gly Lys Gly Ile Arg Ser Val Glu Pro Gly Leu Asp Asp His Val
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Met Val Gly Gly Leu Lys Lys Pro Tyr Met Asn Ala Ser Ser Val Ala
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Lys Ile Val Glu Val Val Gln Arg Trp Lys Trp Gly Pro Glu Leu Glu
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Thr Gln Leu Asp Lys Leu Gln Phe Val Pro Asn Met Val His Ile Thr
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Gln Ser Leu Lys Ile Val Lys Glu Val Asp Ala Ala Leu Ser Leu Phe
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Arg Trp Ala Lys Lys Gln Pro Trp Tyr Leu Pro Ser Asp Glu Cys Tyr
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Val Val Leu Phe Asp Gly Leu Asn Gln Gly Arg Asp Phe Val Gly Ile
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Gln Ser Leu Phe Glu Glu Met Val Gln Asp Ser Ser Ser His Gly Asp
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Gly Cys Lys Ile Asp Thr Gln Thr Tyr Asn Asn Leu Met Met Leu Phe
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Leu Asn Lys Gly Leu Pro Tyr Lys Ala Phe Glu Ile Tyr Glu Ser Met
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Glu Lys Thr Asp Ser Leu Leu Asp Gly Ser Thr Tyr Glu Leu Ile Ile
305 310 315 320

Pro Ser Leu Ala Lys Ser Gly Arg Leu Asp Ala Ala Phe Lys Leu Phe
325 330 335

Gln Gln Met Lys Glu Arg Lys Leu Arg Pro Ser Phe Ser Val Phe Ser
340 345 350

Ser Leu Val Asp Ser Met Gly Lys Ala Gly Arg Leu Asp Thr Ser Met
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Lys Val Tyr Met Glu Met Gln Gly Phe Gly His Arg Pro Ser Ala Thr
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Met Phe Val Ser Leu Ile Asp Ser Tyr Ala Lys Ala Gly Lys Leu Asp
385 390 395 400

Thr Ala Leu Arg Leu Trp Asp Glu Met Lys Lys Ser Gly Phe Arg Pro
405 410 415

Asn Phe Gly Leu Tyr Thr Met Ile Ile Glu Ser His Ala Lys Ser Gly
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Lys Leu Glu Val Ala Met Thr Val Phe Lys Asp Met Glu Lys Ala Gly
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Phe Leu Pro Thr Pro Ser Thr Tyr Ser Cys Leu Leu Glu Met His Ala
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Gly Ser Gly Gln Val Asp Ser Ala Met Lys Ile Tyr Asn Ser Met Thr
465 470 475 480

Asn Ala Gly Leu Arg Pro Gly Leu Ser Ser Tyr Ile Ser Leu Leu Thr
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485

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490

495

Leu Leu Ala Asn Lys Arg Leu Val Asp Val Ala Gly Lys Ile Leu Leu
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Glu Met Lys Ala Met Gly Tyr Ser Val Asp Val Cys Ala Ser Asp Val
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Leu Met Ile Tyr Ile Lys Asp Ala Ser Val Asp Leu Ala Leu Lys Trp
530 535 540

Leu Arg Phe Met Gly Ser Ser Gly Ile Lys Thr Asn Asn Phe Ile Ile
545 550 555 560

Arg Gln Leu Phe Glu Ser Cys Met Lys Asn Gly Leu Tyr Asp Ser Ala
565 570 575

Arg Pro Leu Leu Glu Thr Leu Val His Ser Ala Gly Lys Val Asp Leu
580 585 590

Val Leu Tyr Thr Ser Ile Leu Ala His Leu Val Arg Cys Gln Asp Glu
595 600 605

Asp Lys Glu Arg Gln Leu Met Ser Ile Leu Ser Ala Thr Lys His Lys
610 615 620

Ala His Ala Phe Met Cys Gly Leu Phe Thr Gly Pro Glu Gln Arg Lys
625 630 635 640

Gln Pro Val Leu Thr Phe Val Arg Glu Phe Tyr Gln Gly Ile Asp Tyr
645 650 655

Glu Leu Glu Glu Gly Ala Ala Arg Tyr Phe Val Asn Val Leu Leu Asn
660 665 670

Tyr Leu Val Leu Met Gly Gln Ile Asn Arg Ala Arg Cys Val Trp Lys
675 680 685

Val Ala Tyr Glu Asn Lys Leu Phe Pro Lys Ala Ile Val Phe Asp Gln
690 695 700

His Ile Ala Trp Ser Leu Asp Val Arg Asn Leu Ser Val Gly Ala Ala
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Leu Ile Ala Val Val His Thr Leu His Arg Phe Arg Lys Arg Met Leu
725 730 735

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Tyr Tyr Gly Val Val Pro Arg Arg Ile Lys Leu Val Thr Gly Pro Thr
740 745 750

Leu Lys Ile Val Ile Ala Gln Met Leu Ser Ser Val Glu Ser Pro Phe
755 760 765

Glu Val Ser Lys Val Val Leu Arg Ala Pro Gly Glu Leu Val Met Glu
770 775 780

Trp Phe Lys Lys Pro Ile Val Gln Gln Phe Leu Leu Asn Glu Ile Pro
785 790 795 800

Ser Arg Ser Asp Ile Leu Met His Lys Met Asn Val Met Phe Pro Ser
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cta tca cac tgt tgc cgc cac aca cgc ctc acc agc tct ctt acg ctt 96
Leu Ser His Cys Cys Arg His Thr Arg Leu Thr Ser Ser Leu Thr Leu
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caa tct cct cta aag cag ccc ttt tca tgt ctc cct ttc cgt tgg cgc 144
Gln Ser Pro Leu Lys Gln Pro Phe Ser Cys Leu Pro Phe Arg Trp Arg
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cgc tct tat cgc ggc gga gtc agg agc tca acg acg gag act cat ggt 192
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ttg aaa agg gtc tat cca ttt cac gaa att gaa ccc aag tgg caa cgt Leu Lys Arg Val Tyr Pro Phe His Glu Ile Glu Pro Lys Trp Gln Arg	85	90	95
tat tgg gaa gat aac cga att ttc cg ^g aca cca gac gat gtt gat act Tyr Trp Glu Asp Asn Arg Ile Phe Arg Thr Pro Asp Asp Val Asp Thr	100	105	110
tcg aaa cct aag ttc tac gtc ctc gac atg ttt cca tat cca agt gga Ser Lys Pro Lys Phe Tyr Val Leu Asp Met Phe Pro Tyr Pro Ser Gly	115	120	125
gca gga tta cat gtg gga cat cca ttg ggt tat aca gca act gat att Ala Gly Leu His Val Gly His Pro Leu Gly Tyr Thr Ala Thr Asp Ile	130	135	140
cta gcg agg ctt agg cgt atg caa ggt tac aat gto ttg cat cct atg Leu Ala Arg Leu Arg Arg Met Gln Gly Tyr Asn Val Leu His Pro Met	145	150	155 160
ggt tgg gat gct ttt gga ttg cct gct gaa caa tat gct att gag aca Gly Trp Asp Ala Phe Gly Leu Pro Ala Glu Gln Tyr Ala Ile Glu Thr	165	170	175
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cag ctt tat aag aaa ggt ttg gca tat cag gct gaa gta ccg gtc aat Gln Leu Tyr Lys Lys Gly Leu Ala Tyr Gln Ala Glu Val Pro Val Asn	225	230	235 240
tgg tgc ccg gct ctt ggt act gtt ttg gcc aat gaa gaa gto gto gat Trp Cys Pro Ala Leu Gly Thr Val Leu Ala Asn Glu Glu Val Val Asp	245	250	255
ggt gtt agt gag cgt ggt ggc cac ccg gtt ata aga aag ccg atg agg Gly Val Ser Glu Arg Gly Gly His Pro Val Ile Arg Lys Pro Met Arg	260	265	270
caa tgg atg ctg aag att act gcg tac gct gat cgt ctt cta gaa gat Gln Trp Met Leu Lys Ile Thr Ala Tyr Ala Asp Arg Leu Leu Glu Asp	275	280	285
ttg gac gag ctt gag tgg cct gaa agt ata aag gaa atg caa aga aac Leu Asp Glu Leu Glu Trp Pro Glu Ser Ile Lys Glu Met Gln Arg Asn	290	295	300
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Gly	Glu	Gly	Arg	Glu	Glu	Thr	Asp	Lys	Glu	Ile	Thr	Val	Tyr	Thr	Arg
					325				330				335		
cca	gat	aca	ctt	ttt	gga	gca	act	tac	atg	gtt	gtg	gca	cca	gag	cat
Pro	Asp	Thr	Leu	Phe	Gly	Ala	Thr	Tyr	Met	Val	Val	Ala	Pro	Glu	His
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cag	ttg	ttg	tct	tac	ttt	gta	acc	gca	gaa	cag	aaa	cag	caa	gtt	gag
Gln	Leu	Leu	Ser	Tyr	Phe	Val	Thr	Ala	Glu	Gln	Lys	Gln	Gln	Val	Glu
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gaa	tac	aaa	gat	ttc	gct	tcg	agg	aaa	agt	gat	ctt	gag	aga	aca	gaa
Glu	Tyr	Lys	Asp	Phe	Ala	Ser	Arg	Lys	Ser	Asp	Leu	Glu	Arg	Thr	Glu
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ctt	cag	aag	gac	aag	acg	ggc	gta	ttt	acg	gga	tgt	tat	gcg	aaa	aat
Leu	Gln	Lys	Asp	Lys	Thr	Gly	Val	Phe	Thr	Gly	Cys	Tyr	Ala	Lys	Asn
					385			390			395			400	
cca	gct	aat	gga	gat	gct	att	ccc	ata	tgg	gta	gct	gat	tat	gtt	cta
Pro	Ala	Asn	Gly	Asp	Ala	Ile	Pro	Ile	Trp	Val	Ala	Asp	Tyr	Val	Leu
					405			410				415			
gct	agt	tat	gga	acc	gga	gca	atc	atg	gcg	gtc	cca	gct	cat	gat	act
Ala	Ser	Tyr	Gly	Thr	Gly	Ala	Ile	Met	Ala	Val	Pro	Ala	His	Asp	Thr
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Arg	Asp	Asn	Glu	Phe	Ala	Leu	Lys	Tyr	Asn	Ile	Pro	Ile	Lys	Trp	Val
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gtg	aga	aat	gag	gca	aat	tca	agt	gat	gat	gct	aag	cag	gtt	tat	ccc
Val	Arg	Asn	Glu	Ala	Asn	Ser	Ser	Asp	Asp	Ala	Lys	Gln	Val	Tyr	Pro
					450			455			460				
gga	ttg	ggc	att	att	gaa	aat	tct	tca	act	tta	gaa	aca	gga	ctt	gac
Gly	Leu	Gly	Ile	Ile	Glu	Asn	Ser	Ser	Thr	Leu	Glu	Thr	Gly	Leu	Asp
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ata	aat	caa	cta	tct	agc	aaa	gaa	gct	gct	tta	aaa	gtt	att	gaa	tgg
Ile	Asn	Gln	Leu	Ser	Ser	Lys	Glu	Ala	Ala	Leu	Lys	Val	Ile	Glu	Trp
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gct	gag	aga	act	ggc	aat	gga	aag	aaa	aag	gta	aat	tac	aag	ttg	agg
Ala	Glu	Arg	Thr	Gly	Asn	Gly	Lys	Lys	Lys	Val	Asn	Tyr	Lys	Leu	Arg
					500			505				510			
gat	tgg	cta	ttt	gca	cg	cag	cgt	tac	tgg	ggt	gaa	cct	atc	ccg	att
Asp	Trp	Leu	Phe	Ala	Arg	Gln	Arg	Tyr	Trp	Gly	Glu	Pro	Ile	Pro	Ile
					515			520				525			
tta	att	ttg	gat	gag	tct	ggt	gaa	act	att	gct	att	tca	gaa	tct	gaa
Leu	Ile	Leu	Asp	Glu	Ser	Gly	Glu	Thr	Ile	Ala	Ile	Ser	Glu	Ser	Glu
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ctg	ccc	ctc	act	ttg	cct	gag	tta	aat	gat	ttt	acg	ccc	act	gga	aca
Leu	Pro	Leu	Thr	Leu	Pro	Glu	Leu	Asn	Asp	Phe	Thr	Pro	Thr	Gly	Thr
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tgg gct ggg tct tgc tgg tac tat ctg aga ttc atg gac ccg aaa aac Trp Ala Gly Ser Cys Trp Tyr Tyr Leu Arg Phe Met Asp Pro Lys Asn 595 600 605	1824
cct gaa gca tta gtt gac aag gaa aaa gaa aaa tac tgg agc cca gta Pro Glu Ala Leu Val Asp Lys Glu Lys Glu Lys Tyr Trp Ser Pro Val 610 615 620	1872
gat gta tat gtt ggt ggt gct gag cat gct gtt tta cat tta cta tac Asp Val Tyr Val Gly Gly Ala Glu His Ala Val Leu His Leu Leu Tyr 625 630 635 640	1920
tcg agg ttt tgg cac aag gta ctt tat gac att ggt gtt gtg tct acg Ser Arg Phe Trp His Lys Val Leu Tyr Asp Ile Gly Val Val Ser Thr 645 650 655	1968
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gat act gaa gaa cgg tta aat gaa cat caa caa gtg aca atc ccg gaa Asp Thr Glu Glu Arg Leu Asn Glu His Gln Gln Val Thr Ile Pro Glu 690 695 700	2112
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agc att cgt ctg att cca cgc gtt tat aaa atg agc aaa agt aga gga Ser Ile Arg Leu Ile Pro Arg Val Tyr Lys Met Ser Lys Ser Arg Gly 725 730 735	2208
aat gtc gta aat cct gat gat gtt gta tta gag tat ggt gca gat tct Asn Val Val Asn Pro Asp Asp Val Val Leu Glu Tyr Gly Ala Asp Ser 740 745 750	2256
cta cgt ttg tat gag atg ttc atg gga cca ttt agg gac tca aaa act Leu Arg Leu Tyr Glu Met Phe Met Gly Pro Phe Arg Asp Ser Lys Thr 755 760 765	2304
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tgg aga cta gtc att ggt ttg cct cag tct gat ggt tct ttc aaa gat Trp Arg Leu Val Ile Gly Leu Pro Gln Ser Asp Gly Ser Phe Lys Asp 785 790 795 800	2400
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aag aca aga ggc acc ata gag gtt gaa gaa gga tgc tct gaa gat gat Lys Thr Arg Gly Thr Ile Glu Val Glu Glu Gly Cys Ser Glu Asp Asp 915 920 925	2784
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Gln Ser Pro Leu Lys Gln Pro Phe Ser Cys Leu Pro Phe Arg Trp Arg Page 86
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35

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Ser Lys Lys Glu Ala Leu Val Ser Glu Thr Ala Thr Thr Ser Ile Glu
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Leu Lys Arg Val Tyr Pro Phe His Glu Ile Glu Pro Lys Trp Gln Arg
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Tyr Trp Glu Asp Asn Arg Ile Phe Arg Thr Pro Asp Asp Val Asp Thr
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Ser Lys Pro Lys Phe Tyr Val Leu Asp Met Phe Pro Tyr Pro Ser Gly
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Ala Gly Leu His Val Gly His Pro Leu Gly Tyr Thr Ala Thr Asp Ile
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145 150 155 160

Gly Trp Asp Ala Phe Gly Leu Pro Ala Glu Gln Tyr Ala Ile Glu Thr
165 170 175

Gly Thr His Pro Lys Thr Thr Leu Lys Asn Ile Asp Arg Phe Arg
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Leu Gln Leu Lys Ser Leu Gly Phe Ser Tyr Asp Trp Asp Arg Glu Leu
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Ser Thr Thr Glu Pro Asp Tyr Tyr Lys Trp Thr Gln Trp Ile Phe Leu
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Gln Leu Tyr Lys Lys Gly Leu Ala Tyr Gln Ala Glu Val Pro Val Asn
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Trp Cys Pro Ala Leu Gly Thr Val Leu Ala Asn Glu Glu Val Val Asp
245 250 255

Gly Val Ser Glu Arg Gly Gly His Pro Val Ile Arg Lys Pro Met Arg
260 265 270

Gln Trp Met Leu Lys Ile Thr Ala Tyr Ala Asp Arg Leu Leu Glu Asp
275 280 285

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305 310 315 320

Gly Glu Gly Arg Glu Thr Asp Lys Glu Ile Thr Val Tyr Thr Thr Arg
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Pro Asp Thr Leu Phe Gly Ala Thr Tyr Met Val Val Ala Pro Glu His
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Gln Leu Leu Ser Tyr Phe Val Thr Ala Glu Gln Lys Gln Gln Val Glu
355 360 365

Glu Tyr Lys Asp Phe Ala Ser Arg Lys Ser Asp Leu Glu Arg Thr Glu
370 375 380

Leu Gln Lys Asp Lys Thr Gly Val Phe Thr Gly Cys Tyr Ala Lys Asn
385 390 395 400

Pro Ala Asn Gly Asp Ala Ile Pro Ile Trp Val Ala Asp Tyr Val Leu
405 410 415

Ala Ser Tyr Gly Thr Gly Ala Ile Met Ala Val Pro Ala His Asp Thr
420 425 430

Arg Asp Asn Glu Phe Ala Leu Lys Tyr Asn Ile Pro Ile Lys Trp Val
435 440 445

Val Arg Asn Glu Ala Asn Ser Ser Asp Asp Ala Lys Gln Val Tyr Pro
450 455 460

Gly Leu Gly Ile Ile Glu Asn Ser Ser Thr Leu Glu Thr Gly Leu Asp
465 470 475 480

Ile Asn Gln Leu Ser Ser Lys Glu Ala Ala Leu Lys Val Ile Glu Trp
485 490 495

Ala Glu Arg Thr Gly Asn Gly Lys Lys Lys Val Asn Tyr Lys Leu Arg
500 505 510

Asp Trp Leu Phe Ala Arg Gln Arg Tyr Trp Gly Glu Pro Ile Pro Ile
515 520 525

Leu Ile Leu Asp Glu Ser Gly Glu Thr Ile Ala Ile Ser Glu Ser Glu
530 535 540

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Leu Pro Leu Thr Leu Pro Glu Leu Asn Asp Phe Thr Pro Thr Gly Thr
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Gly Glu Pro Pro Leu Ser Lys Ala Val Ser Trp Val Asn Thr Val Asp
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Pro Ser Thr Gly Lys Pro Ala Lys Arg Glu Thr Ser Thr Met Pro Gln
 580 585 590

Trp Ala Gly Ser Cys Trp Tyr Tyr Leu Arg Phe Met Asp Pro Lys Asn
 595 600 605

Pro Glu Ala Leu Val Asp Lys Glu Lys Glu Lys Tyr Trp Ser Pro Val
 610 615 620

Asp Val Tyr Val Gly Gly Ala Glu His Ala Val Leu His Leu Leu Tyr
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Ser Arg Phe Trp His Lys Val Leu Tyr Asp Ile Gly Val Val Ser Thr
 645 650 655

Lys Glu Pro Phe Lys Cys Val Ile Asn Gln Gly Ile Ile Leu Gly Glu
 660 665 670

Val Gln Tyr Thr Ala Trp Lys Asp Gln Glu Gly Asn Tyr Val Ser Ala
 675 680 685

Asp Thr Glu Glu Arg Leu Asn Glu His Gln Gln Val Thr Ile Pro Glu
 690 695 700

Glu Lys Val Ile Lys Ser Gly Asp His Phe Val Leu Lys Glu Asp Pro
 705 710 715 720

Ser Ile Arg Leu Ile Pro Arg Val Tyr Lys Met Ser Lys Ser Arg Gly
 725 730 735

Asn Val Val Asn Pro Asp Asp Val Val Leu Glu Tyr Gly Ala Asp Ser
 740 745 750

Leu Arg Leu Tyr Glu Met Phe Met Gly Pro Phe Arg Asp Ser Lys Thr
 755 760 765

Trp Asn Thr Ser Gly Ile Glu Gly Val His Arg Phe Leu Ala Arg Thr
 770 775 780

Trp Arg Leu Val Ile Gly Leu Pro Gln Ser Asp Gly Ser Phe Lys Asp
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Leu His Lys Cys Ile Ala Lys Val Thr Glu Glu Ile Glu Ser Thr Arg
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Phe Asn Thr Gly Ile Ser Gly Met Met Glu Phe Val Asn Ala Ala Tyr
835 840 845

Lys Trp Asn Asn Gln Pro Arg Gly Ile Ile Glu Pro Phe Val Leu Leu
850 855 860

Leu Ser Pro Tyr Ala Pro His Met Ala Glu Glu Leu Trp Ser Arg Leu
865 870 875 880

Gly His Pro Asn Ser Leu Ala Tyr Glu Ser Phe Pro Lys Ala Asn Pro
885 890 895

Asp Tyr Leu Lys Asn Thr Thr Ile Val Leu Pro Val Gln Ile Asn Gly
900 905 910

Lys Thr Arg Gly Thr Ile Glu Val Glu Glu Gly Cys Ser Glu Asp Asp
915 920 925

Ala Phe Val Leu Ala Ser Gln Asp Asp Lys Leu Arg Lys Tyr Leu Asp
930 935 940

Gly Gln Ser Ile Lys Lys Arg Ile Tyr Val Pro Gly Lys Ile Leu Asn
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Arg Lys Leu Pro Pro Ala Lys Gly Lys Lys Ile Asn Glu Glu Arg Glu
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gat cgc cgt acg cta ggt tta gtg ttg ctt aga ggt gaa gaa gtt atc 240
Asp Arg Arg Thr Leu Gly Leu Val Leu Arg Gly Glu Glu Val Ile
65 70 75 80

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Ser Met Thr Val Glu Gly Pro Pro Pro Glu Glu Ser Arg Ala Lys
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Ala Gly Ser Ala Ala Val Ala Gly Pro Gly Ile Gly Arg Ala Ala
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ggg cgt gga gtt cct act ggt ccg tta gtt caa gct cag cct ggt tta 384
Gly Arg Gly Val Pro Thr Gly Pro Leu Val Gln Ala Gln Pro Gly Leu
115 120 125

tct ggt cct gtt cgt ggt gtt ggt gga cct gct ccg gga atg atg cag 432
Ser Gly Pro Val Arg Gly Val Gly Gly Pro Ala Pro Gly Met Met Gln
130 135 140

cct cag atc tct cgt cca cca cag ctt tca gct cct ccg att att cga 480
Pro Gln Ile Ser Arg Pro Pro Gln Leu Ser Ala Pro Pro Ile Ile Arg
145 150 155 160

cct ccg gga cag atg ttg cca ccg cct cct ttt ggt ggt caa ggt cct 528
Pro Pro Gly Gln Met Leu Pro Pro Pro Pro Phe Gly Gly Gln Gly Pro
165 170 175

cct atg gga aga ggt cct cca ccg cct tat ggt atg agg cca ccg cca 576
Pro Met Gly Arg Gly Pro Pro Pro Pro Tyr Gly Met Arg Pro Pro Pro
180 185 190

cag cag ttt tct gga cca cca ccg cct cag tat ggg caa agg cca atg 624
Gln Gln Phe Ser Gly Pro Pro Pro Pro Gln Tyr Gly Gln Arg Pro Met
195 200 205

att cct cct cct ggt ggt atg atg aga gga cct cct cca cct cat 672
Ile Pro Pro Pro Gly Gly Met Met Arg Gly Pro Pro Pro Pro His
210 215 220

gga atg caa gga cct cct ccg cct cgc cct gga atg cct cct gct cct 720
Gly Met Gln Gly Pro Pro Pro Pro Arg Pro Gly Met Pro Pro Ala Pro
225 230 235 240

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Gln 774

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35 40 45

Arg Lys Leu Pro Pro Ala Lys Gly Lys Lys Ile Asn Glu Glu Arg Glu
50 55 60

Asp Arg Arg Thr Leu Gly Leu Val Leu Leu Arg Gly Glu Glu Val Ile
65 70 75 80

Ser Met Thr Val Glu Gly Pro Pro Pro Pro Glu Glu Ser Arg Ala Lys
85 90 95

Ala Gly Ser Ala Ala Ala Val Ala Gly Pro Gly Ile Gly Arg Ala Ala
100 105 110

Gly Arg Gly Val Pro Thr Gly Pro Leu Val Gln Ala Gln Pro Gly Leu
115 120 125

Ser Gly Pro Val Arg Gly Val Gly Gly Pro Ala Pro Gly Met Met Gln
130 135 140

Pro Gln Ile Ser Arg Pro Pro Gln Leu Ser Ala Pro Pro Ile Ile Arg
145 150 155 160

Pro Pro Gly Gln Met Leu Pro Pro Pro Pro Phe Gly Gly Gln Gly Pro
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165

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170

175

Pro Met Gly Arg Gly Pro Pro Pro Pro Tyr Gly Met Arg Pro Pro Pro
 180 185 190

Gln Gln Phe Ser Gly Pro Pro Pro Gln Tyr Gly Gln Arg Pro Met
 195 200 205

Ile Pro Pro Pro Gly Gly Met Met Arg Gly Pro Pro Pro Pro His
 210 215 220

Gly Met Gln Gly Pro Pro Pro Arg Pro Gly Met Pro Pro Ala Pro
 225 230 235 240

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Leu Gly Ser Ser Ser Leu Pro Ser Glu Leu Arg Arg Leu Ser Ser Pro	
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gcc gtt cag atc tct ctc cgt acc caa acc agg aag aac ttc cag ata	144
Ala Val Gln Ile Ser Leu Arg Thr Gln Thr Arg Lys Asn Phe Gln Ile	
35 40 45	

caa gct act gga agt tca tat ggg act cat ttt cga gtt tca act ttt	192
Gln Ala Thr Gly Ser Ser Tyr Gly Thr His Phe Arg Val Ser Thr Phe	
50 55 60	

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agg agg cct ggt cag agc agg atc aca act cct aga aaa gag act gat Arg Arg Pro Gly Gln Ser Arg Ile Thr Thr Pro Arg Lys Glu Thr Asp 100 105 110	336
act tgc cgg ata tcg tct gga gtc tct gaa gga atg acg aca gga aca Thr Cys Arg Ile Ser Ser Gly Val Ser Glu Gly Met Thr Thr Gly Thr 115 120 125	384
cct atc cat gtg ttt gta cca aac aca gat cag aga gga ctt gat tac Pro Ile His Val Phe Val Pro Asn Thr Asp Gln Arg Gly Leu Asp Tyr 130 135 140	432
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att ttg aag caa ttt gca gga act gag att ctt gcc tat gtc tcg caa Ile Leu Lys Gln Phe Ala Gly Thr Glu Ile Leu Ala Tyr Val Ser Gln 195 200 205	624
gtt cac cat gtt gta ctt cca gaa gaa ttg gta gac cac gag aat tta Val His His Val Val Leu Pro Glu Glu Leu Val Asp His Glu Asn Leu 210 215 220	672
aca ctc gaa cag ata gaa aat aac att gtc aga tgc cct aat ccc gag Thr Leu Glu Gln Ile Glu Asn Asn Ile Val Arg Cys Pro Asn Pro Glu 225 230 235 240	720
tat gcg gaa aag atg ata gct gcg att gat gct gtc agg aca aaa ggg Tyr Ala Glu Lys Met Ile Ala Ala Ile Asp Ala Val Arg Thr Lys Gly 245 250 255	768
aac tct gtt ggt ggt gtt gtg acc tgc att gtt cggt aat gct cca cgt Asn Ser Val Gly Gly Val Val Thr Cys Ile Val Arg Asn Ala Pro Arg 260 265 270	816
ggg ctt ggt aca ccg gtt ttc gat aaa ctt gaa gca gaa ctg gca aaa Gly Leu Gly Thr Pro Val Phe Asp Lys Leu Glu Ala Glu Leu Ala Lys 275 280 285	864
gct tgt atg tcg cta cct gca act aag gga ttt gag ttt gga agc ggc Ala Cys Met Ser Leu Pro Ala Thr Lys Gly Phe Glu Phe Gly Ser Gly 290 295 300	912
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Thr Asp Glu Asn Gly Arg Ile Arg Thr	Arg Thr Asn Arg Ser Gly Gly			
325	330	335		
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Ile Gln Gly Gly Ile Ser Asn Gly Glu Ile Ile Asn Met Arg Val Ala				
340	345	350		
ttc aag cca aca tca aca att gga agg aag caa aat acg gta acc aga				1104
Phe Lys Pro Thr Ser Thr Ile Gly Arg Lys Gln Asn Thr Val Thr Arg				
355	360	365		
gac aag gta gaa acc gaa atg att gcg cgt ggt cgt cat gat cct tgt				1152
Asp Lys Val Glu Thr Glu Met Ile Ala Arg Gly Arg His Asp Pro Cys				
370	375	380		
gtt gtt cca cga gct gtg cca atg gtg gaa gca atg gtg gct cta gtt				1200
Val Val Pro Arg Ala Val Pro Met Val Glu Ala Met Val Ala Leu Val				
385	390	395	400	
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Leu Val Asp Gln Leu Met Ala Gln Tyr Ala Gln Cys His Leu Phe Pro				
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Ile Asn Pro Glu Leu Gln Glu Pro Leu Gln Ile Glu Gln Pro Gln Asn				
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 35 40 45

Gln Ala Thr Gly Ser Ser Tyr Gly Thr His Phe Arg Val Ser Thr Phe
 50 55 60

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Gly Glu Ser His Gly Gly Val Gly Cys Ile Ile Asp Gly Cys Pro
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Pro Arg Ile Pro Leu Thr Glu Ser Asp Leu Gln Phe Asp Leu Asp Arg
85 90 95

Arg Arg Pro Gly Gln Ser Arg Ile Thr Thr Pro Arg Lys Glu Thr Asp
100 105 110

Thr Cys Arg Ile Ser Ser Gly Val Ser Glu Gly Met Thr Thr Gly Thr
115 120 125

Pro Ile His Val Phe Val Pro Asn Thr Asp Gln Arg Gly Leu Asp Tyr
130 135 140

Ser Glu Met Ser Val Ala Tyr Arg Pro Ser His Ala Asp Ala Thr Tyr
145 150 155 160

Asp Met Lys Tyr Gly Val Arg Ser Val Gln Gly Gly Gly Arg Ser Ser
165 170 175

Ala Arg Glu Thr Ile Gly Arg Val Ala Pro Gly Ala Leu Ala Lys Lys
180 185 190

Ile Leu Lys Gln Phe Ala Gly Thr Glu Ile Leu Ala Tyr Val Ser Gln
195 200 205

Val His His Val Val Leu Pro Glu Glu Leu Val Asp His Glu Asn Leu
210 215 220

Thr Leu Glu Gln Ile Glu Asn Asn Ile Val Arg Cys Pro Asn Pro Glu
225 230 235 240

Tyr Ala Glu Lys Met Ile Ala Ala Ile Asp Ala Val Arg Thr Lys Gly
245 250 255

Asn Ser Val Gly Gly Val Val Thr Cys Ile Val Arg Asn Ala Pro Arg
260 265 270

Gly Leu Gly Thr Pro Val Phe Asp Lys Leu Glu Ala Glu Leu Ala Lys
275 280 285

Ala Cys Met Ser Leu Pro Ala Thr Lys Gly Phe Glu Phe Gly Ser Gly
290 295 300

Phe Ala Gly Thr Phe Leu Thr Gly Leu Glu His Asn Asp Glu Phe Tyr
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 340 345 350

Phe Lys Pro Thr Ser Thr Ile Gly Arg Lys Gln Asn Thr Val Thr Arg
 355 360 365

Asp Lys Val Glu Thr Glu Met Ile Ala Arg Gly Arg His Asp Pro Cys
 370 375 380

Val Val Pro Arg Ala Val Pro Met Val Glu Ala Met Val Ala Leu Val
 385 390 395 400

Leu Val Asp Gln Leu Met Ala Gln Tyr Ala Gln Cys His Leu Phe Pro
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Ser Leu His Tyr His Gly Ser Ser Val Gln Ser Ile Val Val Pro	
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aga agg agt ctt atc tcg ttt cgt cgaa gtc tct tgc tgt tgc ata	144
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Ala Pro Pro Gln Asn Leu Asp Asn Asp Ala Thr Lys Phe Asp Ser Leu			
50	55	60	
acc aag tct gga gga ggt atg tgt aaa gag cga ggg ctt gag aat gat			240
Thr Lys Ser Gly Gly Met Cys Lys Glu Arg Gly Leu Glu Asn Asp			
65	70	75	80
tct gat gtt ctt att gaa tgt aga gat gtc tat aaa tcg ttt ggg gag			288
Ser Asp Val Leu Ile Glu Cys Arg Asp Val Tyr Lys Ser Phe Gly Glu			
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Lys His Ile Leu Lys Gly Val Ser Phe Lys Ile Arg His Gly Glu Ala			
100	105	110	
gtt ggg gtg att ggt cct tct gga act gga aaa tca aca att tta aag			384
Val Gly Val Ile Gly Pro Ser Gly Thr Gly Lys Ser Thr Ile Leu Lys			
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Ile Met Ala Gly Leu Leu Ala Pro Asp Lys Gly Glu Val Tyr Ile Arg			
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Gly Lys Lys Arg Ala Gly Leu Ile Ser Asp Glu Glu Ile Ser Gly Leu			
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195	200	205	
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Glu Val Ile Glu Pro Glu Val Leu Leu Tyr Asp Glu Pro Thr Ala Gly			
245	250	255	
ctt gat cca att gca tca act gta gtt gaa gat ctt ata cgg tct gtt			816
Leu Asp Pro Ile Ala Ser Thr Val Val Glu Asp Leu Ile Arg Ser Val			
260	265	270	
cac atg aca gac gaa gat gca gtt gga aaa cct gga aaa att gcg tct			864
His Met Thr Asp Glu Asp Ala Val Gly Lys Pro Gly Lys Ile Ala Ser			
275	280	285	

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cat gaa ttc aca acc tca act aat cca ata gtt caa cag ttt gct aca His Glu Phe Thr Thr Ser Thr Asn Pro Ile Val Gln Gln Phe Ala Thr 325 330 335	1008
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Thr Lys Ser Gly Gly Met Cys Lys Glu Arg Gly Leu Glu Asn Asp
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Ser Asp Val Leu Ile Glu Cys Arg Asp Val Tyr Lys Ser Phe Gly Glu
85 90 95

Lys His Ile Leu Lys Gly Val Ser Phe Lys Ile Arg His Gly Glu Ala
100 105 110

Val Gly Val Ile Gly Pro Ser Gly Thr Gly Lys Ser Thr Ile Leu Lys
115 120 125

Ile Met Ala Gly Leu Leu Ala Pro Asp Lys Gly Glu Val Tyr Ile Arg
130 135 140

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145 150 155 160

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165 170 175

Val Arg Glu Asn Val Gly Phe Leu Leu Tyr Glu Arg Ser Lys Met Ser
180 185 190

Glu Asn Gln Ile Ser Glu Leu Val Thr Gln Thr Leu Ala Ala Val Gly
195 200 205

Leu Lys Gly Val Glu Asn Arg Leu Pro Ser Glu Leu Ser Gly Gly Met
210 215 220

Lys Lys Arg Val Ala Leu Ala Arg Ser Leu Ile Phe Asp Thr Thr Lys
225 230 235 240

Glu Val Ile Glu Pro Glu Val Leu Leu Tyr Asp Glu Pro Thr Ala Gly
245 250 255

Leu Asp Pro Ile Ala Ser Thr Val Val Glu Asp Leu Ile Arg Ser Val
260 265 270

His Met Thr Asp Glu Asp Ala Val Gly Lys Pro Gly Lys Ile Ala Ser
275 280 285

Tyr Leu Val Val Thr His Gln His Ser Thr Ile Gln Arg Ala Val Asp
290 295 300

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Ala Ala Ser Tyr Pro Pro Pro Thr Gly Pro Phe Leu His Asn Gln Tyr			
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50 55 60	

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 Val Thr Gln Gln Gln Gln Asp Val Ser Ser Ser Ser Ala Ala Thr Asn
 65 70 75 80

ttg cat cct cag aga acg ctg tct tat ccc acg cca cct ctc aat cta
 Leu His Pro Gln Arg Thr Leu Ser Tyr Pro Thr Pro Pro Leu Asn Leu
 85 90 95

caa tcc ccc cgt tcc aat cac aat ccc ggt acg cac atc ctc gct ctc : 336
Gln Ser Pro Arg Ser Asn His Asn Pro Gly Thr His Ile Leu Ala Leu
100 105 110

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 165 170 175

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 180 185 190

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Ile Asn Thr Ala Leu Arg Ser Leu Phe Arg Gly His Ser Gln Arg Val		
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Ile Leu Gly Glu Glu Asp Thr Lys His Pro Arg Val Cys Trp His Cys		
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cac aaa cag gaa att ttg gta gtt tca att ggt aaa cat gta ctg cgt		960
His Lys Gln Glu Ile Leu Val Val Ser Ile Gly Lys His Val Leu Arg		
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Ala	Ile	Gln	Gln	Tyr	Thr	Leu	Asp	Leu	Cys	Leu	Cys	Leu	Pro	Pro	Pro	
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Ile	Glu	Asn	Met	Gly	Leu	Glu	Lys	Ser	Asp	Ser	Ser	Val	Ser	Arg	Glu	
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Ala	Asn	Leu	Val	Glu	Gly	Met	Ser	Glu	Pro	Ser	Gly	Leu	Lys	Pro	Thr	
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Asp	Leu	Pro	Ser	Val	Asp	Ser	Val	Pro	Lys	Pro	Ser	Ile	Ile	Val	Asn	
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Arg	Ser	Glu	Ser	Ala	Asn	Lys	Leu	Ser	Phe	Pro	Ser	Ala	Glu	Ala	Thr	
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Pro	Ser	Gln	Thr	Ser	Gly	Ala	Gly	Ser	Ala	Tyr	Ala	Thr	Leu	Pro	Gln	
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Leu	Pro	Leu	Ser	Pro	Arg	Leu	Ser	Ser	Lys	Leu	Ser	Gly	Tyr	His	Thr	
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Lys	Asp	Ser	Asn	Val	Thr	Pro	Asp	Asp	Asp	Val	Ser	Gly	Met	Arg	Ser
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Pro	Ser	Ala	Phe	Phe	Lys	His	Pro	Thr	His	Leu	Val	Thr	Pro	Ser	Glu
					740				745				750		
ata	ttg	atg	ggc	gtt	tct	tcc	gct	gaa	gcc	tcc	att	act	act	gaa	gac
Ile	Leu	Met	Gly	Val	Ser	Ser	Ala	Glu	Ala	Ser	Ile	Thr	Thr	Glu	Asp
					755				760				765		
agg	aga	gat	agg	gat	gca	aat	att	cag	gac	gtg	aat	aat	gat	cca	aga
Arg	Arg	Asp	Arg	Asp	Ala	Asn	Ile	Gln	Asp	Val	Asn	Asn	Asp	Pro	Arg
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gac	acc	gaa	gta	gag	gtg	aaa	gaa	ata	agt	gaa	gca	agg	tca	aca	cag
Asp	Thr	Glu	Val	Glu	Val	Lys	Glu	Ile	Ser	Glu	Ala	Arg	Ser	Thr	Gln
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Met	Ala	Arg	Asp	Cys	Tyr	Pro	Ser	Thr	Glu	Gly	Thr	Phe	Ile	Pro	Gly
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Glu	Ser	Lys	Ala	Tyr	Gly	Gln	Pro	Ile	Lys	Ala	Gly	Asp	Glu	Ser	Gly
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gtt	gac	tcg	aga	ggt	ggg	cct	gca	aag	ctt	ctt	aaa	gga	aag	aag	cag
Val	Asp	Ser	Arg	Gly	Gly	Pro	Ala	Lys	Leu	Leu	Lys	Gly	Lys	Lys	Gln
					865				870				875		880
aag	gcc	aaa	aat	tca	cag	ggt	ccc	ggt	ttg	tca	tct	aca	tcc	tca	aat
Lys	Ala	Lys	Asn	Ser	Gln	Gly	Pro	Gly	Leu	Ser	Ser	Thr	Ser	Ser	Asn
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Val	Ala	Asn	Leu	Ala	Asp	Ser	Phe	Asn	Glu	Gln	Ser	Gln	Ser	Leu	Ser
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cat	ccc	atg	aca	gat	tta	ctt	cct	cag	ttg	tta	gca	atg	caa	gaa	acg
His	Pro	Met	Thr	Asp	Leu	Leu	Pro	Gln	Leu	Leu	Ala	Met	Gln	Glu	Thr
					915				920				925		
atg	aat	cag	gtg	atg	gct	tcg	cag	aag	gag	atg	cag	aga	caa	cta	tca
Met	Asn	Gln	Val	Met	Ala	Ser	Gln	Lys	Glu	Met	Gln	Arg	Gln	Leu	Ser
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aat	gct	gcc	act	ggc	cct	atc	gga	aaa	gaa	agt	aaa	aga	cta	gaa	gtt
Asn	Ala	Ala	Thr	Gly	Pro	Ile	Gly	Lys	Glu	Ser	Lys	Arg	Leu	Glu	Val
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cgt gac cat gcc cag caa att gtg aat gca acg aca aac ttc atg agc Arg Asp His Ala Gln Gln Ile Val Asn Ala Thr Thr Asn Phe Met Ser 995 1000 1005	3024
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gct gca att ggt cca gcc cta gca cgt tca gta gta cca gtt att Ala Ala Ile Gly Pro Ala Leu Ala Arg Ser Val Val Pro Val Ile 1025 1030 1035	3114
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gag tcc tca gtc ata cct tcc ttt gag aag gca tgc aag gcc atg Glu Ser Ser Val Ile Pro Ser Phe Glu Lys Ala Cys Lys Ala Met 1100 1105 1110	3339
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gct cat act cta aag gaa tca att act tct gcg tcg tca gtt gct Ala His Thr Leu Lys Glu Ser Ile Thr Ser Ala Ser Ser Val Ala 1145 1150 1155	3474
caa gcc tta agt cgt gag tta gcc gag acc caa agg aat ctc tta Gln Ala Leu Ser Arg Glu Leu Ala Glu Thr Gln Arg Asn Leu Leu 1160 1165 1170	3519
gct ctc gca gct gct gga gca aat tct ggt ggg tct aat tcc ttg Ala Leu Ala Ala Ala Gly Ala Asn Ser Gly Gly Ser Asn Ser Leu 1175 1180 1185	3564
gtt act caa cta agt ggc gga cct ttg ggt gct ctt ctt gaa aag Val Thr Gln Leu Ser Gly Gly Pro Leu Gly Ala Leu Leu Glu Lys 1190 1195 1200	3609

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tct gaa cgg aag tac gaa gaa	tct ttc act tcg gcc	cta cag aga	3699
Ser Glu Arg Lys Tyr Glu Glu	Ser Phe Thr Ser Ala	Leu Gln Arg	
1220 1225	1230		
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Ser Asp Val Ser Ile Val Ser	Trp Leu Cys Ser Gln	Val Asp Leu	
1235 1240	1245		
cgt gga tta ctg gcg atg aat	ccg ctt cca ctg agc	caa ggc gtg	3789
Arg Gly Leu Leu Ala Met Asn	Pro Leu Pro Leu Ser	Gln Gly Val	
1250 1255	1260		
ctt ctt tca ctg ctg cag cag	cta gcc tgt gac att	agc aag gac	3834
Leu Leu Ser Leu Leu Gln Gln	Leu Ala Cys Asp Ile	Ser Lys Asp	
1265 1270	1275		
aca tcc cgt aag ctg gct tgg	atg act gat gtg gtt	gca gcc ata	3879
Thr Ser Arg Lys Leu Ala Trp	Met Thr Asp Val Val	Ala Ala Ile	
1280 1285	1290		
aac cca tca gac cag atg att	gcg gtc cac gct ccg	cca atc ttt	3924
Asn Pro Ser Asp Gln Met Ile	Ala Val His Ala Arg	Pro Ile Phe	
1295 1300	1305		
gaa cag gta tat cag att ctg	cac cat cac cgc aac	gca ccg gga	3969
Glu Gln Val Tyr Gln Ile Leu	His His His Arg Asn	Ala Pro Gly	
1310 1315	1320		
agc gat gtc tca gcc atc aga	ctg ata atg cac gtg	atc aac tcc	4014
Ser Asp Val Ser Ala Ile Arg	Leu Ile Met His Val	Ile Asn Ser	
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Ala Ala Ser Tyr Pro Pro Pro Thr Gly Pro Phe Leu His Asn Gln Tyr
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35

40

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45

Asp Gln Gln His Tyr Ala Pro Pro Gly Ile Ser Ala Gln Pro Ser Pro
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Val Thr Gln Gln Gln Asp Val Ser Ser Ser Ala Ala Thr Asn
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Leu His Pro Gln Arg Thr Leu Ser Tyr Pro Thr Pro Pro Leu Asn Leu
85 90 95

Gln Ser Pro Arg Ser Asn His Asn Pro Gly Thr His Ile Leu Ala Leu
100 105 110

Leu Asn Asn Thr Asn Asn Gly Ala Pro Val Ala Asn Gln Glu Pro Ser
115 120 125

His Gln Leu Pro Val Val Asn His Asn Glu Ile Ala Arg Ser Phe Pro
130 135 140

Gly Gly Ser Gly Pro Ile Arg Val Pro Ser Cys Lys Leu Pro Lys Gly
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Arg Arg Leu Ile Gly Glu His Ala Val Tyr Asp Val Asp Val Arg Leu
165 170 175

Gln Gly Glu Ile Gln Pro Gln Leu Glu Val Thr Pro Ile Thr Lys Tyr
180 185 190

Gly Ser Asp Pro Gln Leu Val Val Gly Arg Gln Ile Ala Val Asn Lys
195 200 205

Val Tyr Ile Cys Tyr Gly Leu Lys Gly Asn Ile Arg Val Leu Asn
210 215 220

Ile Asn Thr Ala Leu Arg Ser Leu Phe Arg Gly His Ser Gln Arg Val
225 230 235 240

Thr Asp Met Ala Phe Phe Ala Glu Asp Val Asp Met Leu Ala Ser Val
245 250 255

Ser Leu Asp Gly Lys Val Phe Val Trp Lys Ile Ser Glu Gly Ser Glu
260 265 270

Gly Glu Asp Gln Pro Gln Ile Thr Gly Lys Ile Val Leu Ala Leu Gln
275 280 285

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Ile Leu Gly Glu Glu Asp Thr Lys His Pro Arg Val Cys Trp His Cys
290 295 300

His Lys Gln Glu Ile Leu Val Val Ser Ile Gly Lys His Val Leu Arg
305 310 315 320

Ile Asp Thr Thr Lys Val Gly Arg Gly Glu Val Phe Ser Ala Glu Ala
325 330 335

Pro Leu Gln Cys Pro Leu Asp Lys Leu Ile Asp Gly Val Gln Ile Val
340 345 350

Gly Lys His Asp Gly Glu Val Thr Asp Leu Ser Met Cys Gln Trp Met
355 360 365

Thr Thr Arg Leu Val Ser Ser Val Asp Gly Thr Ile Lys Ile Trp
370 375 380

Gln Asp Arg Lys Ala Gln Pro Leu Val Val Leu Arg Pro His Asp Gly
385 390 395 400

His Pro Val Ser Ser Ala Thr Phe Val Thr Ser Pro Glu Arg Pro Asp
405 410 415

His Ile Ile Leu Ile Thr Gly Gly Pro Leu Asn Arg Glu Met Lys Ile
420 425 430

Trp Val Ser Ala Gly Glu Glu Gly Trp Leu Leu Pro Ala Asp Ala Glu
435 440 445

Ser Trp Arg Cys Thr Gln Thr Leu Asp Leu Lys Ser Ser Thr Glu Pro
450 455 460

Arg Ala Glu Glu Ala Phe Phe Asn Gln Val Ile Ala Leu Ser Glu Ala
465 470 475 480

Gly Leu Leu Leu Leu Ala Asn Ala Lys Arg Asn Ala Leu Tyr Ala Val
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Ser Glu Phe Thr Val Thr Met Pro Ile Leu Ser Phe Ile Gly Thr Asn
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Asp Pro Pro Glu Glu Pro Ile Val Lys Val Tyr Cys Val Gln Thr Leu
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 565 570 575

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 595 600 605

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Ser Gln Ala Ile Val Pro Pro Asn Gly Glu Pro Lys Thr Ser Gly Leu
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 645 650 655

Leu Pro Leu Ser Pro Arg Leu Ser Ser Lys Leu Ser Gly Tyr His Thr
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Pro Val Glu Ala Ile Glu Pro Val Ile Pro His His Glu Leu Gly Gly
 675 680 685

Lys Thr Pro Ser Ala Asp Tyr Ser Val Asp Arg Gln Met Asp Ala Val
 690 695 700

Gly Glu Arg Asn Leu Asp Val Ser Ser Val Glu Glu Ile Ser Arg Ser
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Lys Asp Ser Asn Val Thr Pro Asp Asp Asp Val Ser Gly Met Arg Ser
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Pro Ser Ala Phe Phe Lys His Pro Thr His Leu Val Thr Pro Ser Glu
 740 745 750

Ile Leu Met Gly Val Ser Ser Ala Glu Ala Ser Ile Thr Thr Glu Asp
 755 760 765

Arg Arg Asp Arg Asp Ala Asn Ile Gln Asp Val Asn Asn Asp Pro Arg
 770 775 780

Asp Thr Glu Val Glu Val Lys Glu Ile Ser Glu Ala Arg Ser Thr Gln
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Asn Arg Glu Lys Val Phe Cys Ser Gln Val Ser Asn Leu Ser Thr Glu
820 825 830

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835 840 845

Glu Ser Lys Ala Tyr Gly Gln Pro Ile Lys Ala Gly Asp Glu Ser Gly
850 855 860

Val Asp Ser Arg Gly Gly Pro Ala Lys Leu Leu Lys Gly Lys Lys Gln
865 870 875 880

Lys Ala Lys Asn Ser Gln Gly Pro Gly Leu Ser Ser Thr Ser Ser Asn
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Val Ala Asn Leu Ala Asp Ser Phe Asn Glu Gln Ser Gln Ser Leu Ser
900 905 910

His Pro Met Thr Asp Leu Leu Pro Gln Leu Leu Ala Met Gln Glu Thr
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995 1000 1005

Lys Glu Leu Asn Ala Met Phe Glu Lys Thr Ile Lys Lys Glu Leu
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1025 1030 1035

Glu Lys Thr Val Ser Ser Ala Ile Thr Glu Ser Phe Gln Arg Gly
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Lys Leu Glu Ala Thr Val Ala Arg Gln Ile Gln Ala Gln Phe Gln		
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Thr Ser Gly Lys Gln Ala Leu Gln Glu Gly Leu Arg Ser Ser Val		
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Glu Ser Ser Val Ile Pro Ser Phe Glu Lys Ala Cys Lys Ala Met		
1100	1105	1110
Phe Asp Gln Ile Asp Ser Ala Phe Gln Lys Gly Ile Ala Glu His		
1115	1120	1125
Thr Asn Ala Ala Gln Gln Arg Phe Asp Ser Gly His Ser Gln Leu		
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Ala His Thr Leu Lys Glu Ser Ile Thr Ser Ala Ser Ser Val Ala		
1145	1150	1155
Gln Ala Leu Ser Arg Glu Leu Ala Glu Thr Gln Arg Asn Leu Leu		
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Ala Leu Ala Ala Ala Gly Ala Asn Ser Gly Gly Ser Asn Ser Leu		
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Val Thr Gln Leu Ser Gly Gly Pro Leu Gly Ala Leu Leu Glu Lys		
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Val Glu Ala Pro Met Asp Pro Thr Thr Glu Leu Ser Arg Leu Ile		
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Ser Asp Val Ser Ile Val Ser Trp Leu Cys Ser Gln Val Asp Leu		
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Arg Gly Leu Leu Ala Met Asn Pro Leu Pro Leu Ser Gln Gly Val		
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Leu Leu Ser Leu Leu Gln Gln Leu Ala Cys Asp Ile Ser Lys Asp		
1265	1270	1275

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1295 1300 1305

Glu Gln Val Tyr Gln Ile Leu His His His Arg Asn Ala Pro Gly
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Phe Pro Asp Arg Ile Phe Pro Pro Phe Leu Val Pro Asn Thr Leu Val
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85

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Gly Asp Leu Leu Pro Ala Val Val Pro Asp Tyr Arg Arg Pro Phe Arg				
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Leu Leu Pro Tyr Gly Val Ser Pro Lys Leu Thr Asp Asp Glu Met Thr				
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aca ata agg aga ctt ggt aga cca ctc cct tgt cat ttt gct tta ggt				1200
Thr Ile Arg Arg Leu Gly Arg Pro Leu Pro Cys His Phe Ala Leu Gly				
385	390	395	400	
agg aat aga aat ttg cag gga cta gct gtt gca att gtc aag ctt tgg				1248
Arg Asn Arg Asn Leu Gln Gly Leu Ala Val Ala Ile Val Lys Leu Trp				
405	410	415		
gag aaa tgt gag ctt gcc aag ata gca gtg aag aga gga gtt cag aac				1296
Glu Lys Cys Glu Leu Ala Lys Ile Ala Val Lys Arg Gly Val Gln Asn				
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Thr Asn Ser Glu Leu Met Ala Glu Glu Leu Lys Trp Leu Thr Gly Gly				
435	440	445		
act ctg ata tct cgg gat aaa gat ttc att gtc ctg tac aga gga aag				1392
Thr Leu Ile Ser Arg Asp Lys Asp Phe Ile Val Leu Tyr Arg Gly Lys				
450	455	460		
gat ttc ctc cca tct gca gtt tct tct gca ata gaa gag agg aga agg				1440
Asp Phe Leu Pro Ser Ala Val Ser Ser Ala Ile Glu Glu Arg Arg Arg				
465	470	475	480	
caa aca atg ata atg gag aat tct agt gtg cat ggt aat aag ctg act				1488
Gln Thr Met Ile Met Glu Asn Ser Ser Val His Gly Asn Lys Leu Thr				
485	490	495		
gaa aac gaa gag gaa ata aaa cct cgg gct gtt aaa gag gat att gaa				1536
Glu Asn Glu Glu Ile Lys Pro Arg Ala Val Lys Glu Asp Ile Glu				
500	505	510		
cta gaa gct aag gat cag aag gat cat ata caa acc cat cag atg aaa				1584
Leu Glu Ala Lys Asp Gln Lys Asp His Ile Gln Thr His Gln Met Lys				
515	520	525		
tca aga cag cga aat tct cct gag gca atc ctt gaa aaa act agt atg				1632
Ser Arg Gln Arg Asn Ser Pro Glu Ala Ile Leu Glu Lys Thr Ser Met				
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aag ttg tcc atg gcg ttg gaa aag aaa gca aat gca gaa aaa gtc ctg				1680
Lys Leu Ser Met Ala Leu Glu Lys Ala Asn Ala Glu Lys Val Leu				
545	550	555	560	
gcg gat ctg gag aat aga gag agt cct caa ctt tct gat att gac aag				1728
Ala Asp Leu Glu Asn Arg Glu Ser Pro Gln Leu Ser Asp Ile Asp Lys				
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Glu Gly Ile Thr Asn Asp Glu Lys Tyr Met Leu Arg Lys Ile Gly Leu				
580	585	590		

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atc att tgt aat gaa tat agc att gaa gct gct cac aaa gta gca gaa Ile Ile Cys Asn Glu Tyr Ser Ile Glu Ala Ala His Lys Val Ala Glu 625 630 635 640	1920
atc ttg gaa gca gaa agt ggt ggc ata cta gtt gct gtg gag atg gtt Ile Leu Glu Ala Glu Ser Gly Gly Ile Leu Val Ala Val Glu Met Val 645 650 655	1968
agt aag ggc tat gca atc att gtg tat cgt gga aag aat tat gag cgg Ser Lys Gly Tyr Ala Ile Ile Val Tyr Arg Gly Lys Asn Tyr Glu Arg 660 665 670	2016
cct caa tgt cta cga cct caa aca ctt ctc agt aag aga gag gcg ctg Pro Gln Cys Leu Arg Pro Gln Thr Leu Leu Ser Lys Arg Glu Ala Leu 675 680 685	2064
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ctg aaa ctt tcc aac aat atc gaa gaa ttg aac cgt caa ttg gtc gag Leu Lys Leu Ser Asn Asn Ile Glu Glu Leu Asn Arg Gln Leu Val Glu 705 710 715 720	2160
gac agc gca acc aat gaa act tgg tca gat ggg gaa tca agt aac atg Asp Ser Ala Thr Asn Glu Thr Trp Ser Asp Gly Glu Ser Ser Asn Met 725 730 735	2208
atg gtc gaa gaa gaa aca gaa aat cag cat act gaa cct gag aaa gca Met Val Glu Glu Thr Glu Asn Gln His Thr Glu Pro Glu Lys Ala 740 745 750	2256
aga gaa aaa att gaa ctt ggc tat tca tct gac tta tca gtt cct tcc Arg Glu Lys Ile Glu Leu Gly Tyr Ser Ser Asp Leu Ser Val Pro Ser 755 760 765	2304
tct ggt gaa gaa aac tgg gag gat gac agc gaa ggt gaa gta gac cca Ser Gly Glu Glu Asn Trp Glu Asp Asp Ser Glu Gly Glu Val Asp Pro 770 775 780	2352
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aga tca ctg ccg cac aac agc ttc ctg aat gcc aat cga aag tta cca Arg Ser Leu Pro His Asn Ser Phe Leu Asn Ala Asn Arg Lys Leu Pro 835 840 845	2544

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gca gta gga aga agc aac gtt gtt aca ggt tta gca aga aca ctg aag Ala Val Gly Arg Ser Asn Val Val Thr Gly Leu Ala Arg Thr Leu Lys 900 905 910	2736
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cgc gga tgg gga gcg gaa gaa gaa atg aaa agc ttc tac cca aat aac Arg Gly Trp Gly Ala Glu Glu Met Lys Ser Phe Tyr Pro Asn Asn 965 970 975	2928
aat gtc aaa agc tct ata aat cta ccc tct acg aga agc ttt gtt gat Asn Val Lys Ser Ser Ile Asn Leu Pro Ser Thr Arg Ser Phe Val Asp 980 985 990	2976
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20

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25

30

Ser Arg Arg Asn Val Ser Arg Ala Asn Ser Gly Ile Phe Cys Ser Ser
35 40 45

Ala Ser Gly Arg Lys Thr Leu Pro Gln Ser Ala Ile Gln Arg Ile Ala
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Thr Arg Arg Ile Thr Gly Glu Glu Ser Gly Lys Asn Ser Pro Gly Glu
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Ile Phe Val Pro Leu Pro Lys Gln Leu Pro Ile His Arg Val Gly His
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Thr Ile Asp Thr Ser Trp Ser Thr Pro Ser Tyr Pro Val Pro Lys Pro
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Lys Lys Glu Thr Glu Met Glu Arg Lys Lys Glu Glu Lys Val Pro Ser
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Val Gly Ile Arg Leu Thr Lys Lys Leu Lys Ile Gly Lys Ala Gly Ile
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Thr Glu Gly Ile Val Asn Gly Ile His Glu Arg Trp Arg Thr Thr Glu
195 200 205

Val Val Lys Ile Phe Cys Glu Asp Ile Ser Arg Met Asn Met Lys Arg
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Tyr Phe Val Ser Asp Arg Asp Leu Ala His Glu Ala Ala Ser Gly Ala
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325 330 335

Gly Pro Arg Phe Thr Asp Trp Trp Ala Tyr Asp Pro Leu Pro Val Asp
340 345 350

Gly Asp Leu Leu Pro Ala Val Val Pro Asp Tyr Arg Arg Pro Phe Arg
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Asp Phe Leu Pro Ser Ala Val Ser Ser Ala Ile Glu Glu Arg Arg Arg
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Leu Glu Ala Lys Asp Gln Lys Asp His Ile Gln Thr His Gln Met Lys
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565 570 575

Glu Gly Ile Thr Asn Asp Glu Lys Tyr Met Leu Arg Lys Ile Gly Leu
580 585 590

Lys Met Lys Pro Phe Leu Leu Gly Arg Arg Gly Val Phe Asp Gly
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Ser Lys Gly Tyr Ala Ile Ile Val Tyr Arg Gly Lys Asn Tyr Glu Arg
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675 680 685

Lys Arg Ser Val Glu Ala Gln Arg Arg Lys Ser Leu Lys Leu His Val
690 695 700

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Asp Ser Ala Thr Asn Glu Thr Trp Ser Asp Gly Glu Ser Ser Asn Met
725 730 735

Met Val Glu Glu Glu Thr Glu Asn Gln His Thr Glu Pro Glu Lys Ala
740 745 750

Arg Glu Lys Ile Glu Leu Gly Tyr Ser Ser Asp Leu Ser Val Pro Ser
755 760 765

Ser Gly Glu Glu Asn Trp Glu Asp Asp Ser Glu Gly Glu Val Asp Pro
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820 825 830

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Gly Ser Ser Thr Gly Ser Gly Ser Gln Ile Ser Ala Leu Arg Glu Arg
850 855 860

Lys Ser Glu Asn Asp Gly Leu Val Thr Asp Leu Ser Asn Arg Glu Arg
865 870 875 880

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900 905 910

Met His Phe Gln Lys Asn Pro Leu Ala Ile Val Asn Val Lys Gly Arg
915 920 925

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930 935 940

Thr Gly Ala Leu Leu Val Ser Gln Glu Pro Ser Lys Val Ile Leu Tyr
945 950 955 960

Arg Gly Trp Gly Ala Glu Glu Glu Met Lys Ser Phe Tyr Pro Asn Asn
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 Asn Ile Thr Ser Pro Glu Asp Ser Asp Phe Asp Glu Leu Glu Ser Pro
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 Ile Glu Pro Lys Ala Ser Asp Pro Val Ser Arg Phe Ser Gly Glu Glu
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 Arg Val Met Glu Glu Arg Pro Leu Glu Asn Gly Leu Asp Ser Gly Ile
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 Phe Lys Ala Ile Leu Val Gly Gln Val Gly Gln Leu Pro Leu Gln Lys
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 Lys Leu Lys Ser Gly Arg Thr Val Thr Leu Phe Ser Val Gly Thr Gly
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 ggg atc agg aac aac cgg aga ccg ctt att aac gaa gat ccg aga gag 384
 Gly Ile Arg Asn Asn Arg Arg Pro Leu Ile Asn Glu Asp Pro Arg Glu
 115 120 125
 tat gcg agc cgg tct gcg gtg cag tgg cac cgt gtc tct gtt tac cct 432
 Tyr Ala Ser Arg Ser Ala Val Gln Trp His Arg Val Ser Val Tyr Pro
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 Glu Arg Leu Ala Asp Leu Val Leu Lys Asn Val Glu Pro Gly Thr Val
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 atc tac tta gag ggt aat ctg gag acg aag ata ttc act gat cct gtc 528
 Ile Tyr Leu Glu Gly Asn Leu Glu Thr Lys Ile Phe Thr Asp Pro Val
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 Arg Val Val Phe Leu Gly Lys Ala Gly Asp Met Gln Gln Pro Ser Ser
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Lys Leu Lys Ser Gly Arg Thr Val Thr Leu Phe Ser Val Gly Thr Gly
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Gly Ile Arg Asn Asn Arg Arg Pro Leu Ile Asn Glu Asp Pro Arg Glu
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Tyr Ala Ser Arg Ser Ala Val Gln Trp His Arg Val Ser Val Tyr Pro
 130 135 140

Glu Arg Leu Ala Asp Leu Val Leu Lys Asn Val Glu Pro Gly Thr Val
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145 150 70166USNP.ST25 155 160

Ile Tyr Leu Glu Gly Asn Leu Glu Thr Lys Ile Phe Thr Asp Pro Val
165 170 175

Thr Gly Leu Val Arg Arg Ile Arg Glu Val Ala Ile Arg Arg Asn Gly
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		380	
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cat aag gcg gtt gat aaa tgg aac tca cag ctc aag tct ctt tct tca His Lys Ala Val Asp Lys Trp Asn Ser Gln Leu Lys Ser Leu Ser Ser	420	425	1296
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Phe Lys Thr Asn Leu Lys Leu Cys Asn Ile Trp Phe Asp Ile Gly Glu
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180 185 190

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195 200 205

Lys Leu Lys Gln Leu Tyr His Lys Ala Leu Ala Ile Lys Ser Ala Ile
210 215 220

Pro His Pro Arg Ile Met Gly Ile Ile Arg Glu Cys Gly Gly Lys Met
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260 265 270

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275 280 285

Pro Phe Asp Gly Gln Glu Ala Lys Pro Tyr Lys Asn Asp Pro Glu Ile
290 295 300

Leu Ala Met Thr Asn Leu Ile Ala Ala Tyr Gln Arg Asn Glu Ile Ile
305 310 315 320

Glu Phe Glu Arg Ile Leu Lys Ser Asn Arg Arg Thr Ile Met Asp Asp
325 330 335

Pro Phe Ile Arg Asn Tyr Met Glu Asp Leu Leu Lys Lys Val Arg Thr
340 345 350

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Gln Val Leu Leu Lys Leu Ile Lys Pro Tyr Thr Lys Ile Gly Ile Pro
355 360 365

Phe Ile Ser Lys Glu Leu Asn Val Pro Glu Thr Asp Val Thr Glu Leu
370 375 380

Leu Val Ser Leu Ile Leu Asp Ser Arg Ile Asp Gly His Ile Asp Glu
385 390 395 400

Met Asn Arg Tyr Leu Leu Arg Gly Asp Ser Gly Asn Gly Arg Lys Leu
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 1 5 10 15

ctc aca atc ttg tcc gga gcc gac caa gcc ttg gct tac gtc aag aaa 96
 Leu Thr Ile Leu Ser Gly Ala Asp Gln Ala Leu Ala Tyr Val Lys Lys
 20 25 30

cca cat gtg agc caa cgc aac aaa acg gcg tta gca gcc gtc gcc gga
 Pro His Val Ser Gln Arg Asn Lys Thr Ala Leu Ala Ala Val Ala Gly
 35 40 45

aga gga gga gga aaa gag atg ttg aaa ggg agg aag cag acg agt ggt 192
 Arg Gly Gly Gly Lys Glu Met Leu Lys Gly Arg Lys Gln Thr Ser Gly
 50 55 60

tgt aac ttg ttt caa ggg aga tgg att ttc gag act tct tac cct ttc 240

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Cys Asn Leu Phe Gln Gly Arg Trp Val Phe Asp Ala Ser Tyr Pro Phe			
65	70	75	80
tac gat tca tcc acg tgc cct ttc atc gac ggt gag ttc gac tgt ctc			288
Tyr Asp Ser Ser Thr Cys Pro Phe Ile Asp Gly Glu Phe Asp Cys Leu			
85	90	95	
aaa ttc ggc cga cca gac aaa cag ttc ctt aag tac tct tgg cag cct			336
Lys Phe Gly Arg Pro Asp Lys Gln Phe Leu Lys Tyr Ser Trp Gln Pro			
100	105	110	
gat tca tgc acc gtc cca agg ttt gat ggg gaa gcg ttt ttg aag aaa			384
Asp Ser Cys Thr Val Pro Arg Phe Asp Gly Glu Ala Phe Leu Lys Lys			
115	120	125	
tgg aga ggg aaa cga gtg atg ttc gtg ggt gac tca ctg agt cta aac			432
Trp Arg Gly Lys Arg Val Met Phe Val Gly Asp Ser Leu Ser Leu Asn			
130	135	140	
atg tgg gaa tcg ttg gca tgg atg ata cat tcg tcg gtt cca aac act			480
Met Trp Glu Ser Leu Ala Cys Met Ile His Ser Ser Val Pro Asn Thr			
145	150	155	160
aag acc act ttt ctc aag cga acc cca ctc tcc tct ctc act ttc cag			528
Lys Thr Thr Phe Leu Lys Arg Thr Pro Leu Ser Ser Leu Thr Phe Gln			
165	170	175	
gaa tat gac gtc aca cta ttc cta tac cga aca cca tac cta gtg gac			576
Glu Tyr Asp Val Thr Leu Phe Leu Tyr Arg Thr Pro Tyr Leu Val Asp			
180	185	190	
atc tcc aaa gaa agt gtc ggg cgt gtg ctt aac ctt gga gcc att gaa			624
Ile Ser Lys Glu Ser Val Gly Arg Val Leu Asn Leu Gly Ala Ile Glu			
195	200	205	
gat gga gct gat gct tgg aaa aat atg gac ctc ctc gtc ttc aat tct			672
Asp Gly Ala Asp Ala Trp Lys Asn Met Asp Leu Leu Val Phe Asn Ser			
210	215	220	
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Trp His Trp Trp Thr His Thr Gly Val Gln Ser Gln Gly Trp Asp Phe			
225	230	235	240
ata aga gat ggg tct tca ctg atg aga gac atg gac cgc ctt gat gct			768
Ile Arg Asp Gly Ser Ser Leu Met Arg Asp Met Asp Arg Leu Asp Ala			
245	250	255	
ttc aac aaa gga ctc acc act tgg ggt caa tgg gtt gat caa aat gtt			816
Phe Asn Lys Gly Leu Thr Thr Trp Gly Gln Trp Val Asp Gln Asn Val			
260	265	270	
aat gtt tcg caa acc cga gtc ttc ttc caa ggc att tct ccc act cac			864
Asn Val Ser Gln Thr Arg Val Phe Phe Gln Gly Ile Ser Pro Thr His			
275	280	285	
tac atg gga agg gaa tgg aac gag ccg agg aaa act tgc aac ggg cag			912
Tyr Met Gly Arg Glu Trp Asn Glu Pro Arg Lys Thr Cys Asn Gly Gln			
290	295	300	
atg caa ccg ttg acc gga tca aca tac cca ggt ggt tca ctt cct gca			960
Met Gln Pro Leu Thr Gly Ser Thr Tyr Pro Gly Gly Ser Leu Pro Ala			
305	310	315	320

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Ala Ser Ile Val Ser Arg Val Leu Ser Thr Met Arg Thr Pro Val Tyr
325 330 335 1008

tta ctc gac atc aca act cta tct caa ctg aga aaa gat gct cat cca 1056
 Leu Leu Asp Ile Thr Thr Leu Ser Gln Leu Arg Lys Asp Ala His Pro
 340 345 350

tct aca tat gga ggc gat ggc gga acg gat tgc agt cac tgg tgc ctt 1104
 Ser Thr Tyr Gly Gly Asp Gly Gly Thr Asp Cys Ser His Trp Cys Leu
 355 360 365

cct ggc ttg ccg gat act tgg aac cag ctt ctc tat gca gct ctt tcg	1152
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<213> *Arabidopsis thaliana*

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Arg Gly Gly Lys Glu Met Leu Lys Gly Arg Lys Gln Thr Ser Gly
50 55 60

Cys Asn Leu Phe Gln Gly Arg Trp Val Phe Asp Ala Ser Tyr Pro Phe
65 70 75 80

Tyr Asp Ser Ser Thr Cys Pro Phe Ile Asp Gly Glu Phe Asp Cys Leu
85 90 95

Lys Phe Gly Arg Pro Asp Lys Gln Phe Leu Lys Tyr Ser Trp Gln Pro
100 105 110

Asp Ser Cys Thr Val Pro Arg Phe Asp Gly Glu Ala Phe Leu Lys Lys
115 120 125

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Trp Arg Gly Lys Arg Val Met Phe Val Gly Asp Ser Leu Ser Leu Asn
130 135 140

Met Trp Glu Ser Leu Ala Cys Met Ile His Ser Ser Val Pro Asn Thr
145 150 155 160

Lys Thr Thr Phe Leu Lys Arg Thr Pro Leu Ser Ser Leu Thr Phe Gln
165 170 175

Glu Tyr Asp Val Thr Leu Phe Leu Tyr Arg Thr Pro Tyr Leu Val Asp
180 185 190

Ile Ser Lys Glu Ser Val Gly Arg Val Leu Asn Leu Gly Ala Ile Glu
195 200 205

Asp Gly Ala Asp Ala Trp Lys Asn Met Asp Leu Leu Val Phe Asn Ser
210 215 220

Trp His Trp Trp Thr His Thr Gly Val Gln Ser Gln Gly Trp Asp Phe
225 230 235 240

Ile Arg Asp Gly Ser Ser Leu Met Arg Asp Met Asp Arg Leu Asp Ala
245 250 255

Phe Asn Lys Gly Leu Thr Thr Trp Gly Gln Trp Val Asp Gln Asn Val
260 265 270

Asn Val Ser Gln Thr Arg Val Phe Phe Gln Gly Ile Ser Pro Thr His
275 280 285

Tyr Met Gly Arg Glu Trp Asn Glu Pro Arg Lys Thr Cys Asn Gly Gln
290 295 300

Met Gln Pro Leu Thr Gly Ser Thr Tyr Pro Gly Gly Ser Leu Pro Ala
305 310 315 320

Ala Ser Ile Val Ser Arg Val Leu Ser Thr Met Arg Thr Pro Val Tyr
325 330 335

Leu Leu Asp Ile Thr Thr Leu Ser Gln Leu Arg Lys Asp Ala His Pro
340 345 350

Ser Thr Tyr Gly Gly Asp Gly Gly Thr Asp Cys Ser His Trp Cys Leu
355 360 365

Pro Gly Leu Pro Asp Thr Trp Asn Gln Leu Leu Tyr Ala Ala Leu Ser
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370

375

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Lys Arg Glu Ser Leu Ile Ile Pro Ser Val Ile Cys Ser Phe Pro Phe		
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acc tct tct tcg ttc cgt cca aag caa acc cag aaa ctg aag cgt ctg		144
Thr Ser Ser Phe Arg Pro Lys Gln Thr Gln Lys Leu Lys Arg Leu		
35 40 45		
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Val Gln Phe Cys Ala Pro Tyr Glu Val Gly Gly Tyr Thr Asp Glu		
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gaa ttg ttc gaa aga tac gga act cag caa aat caa act aat gtc aaa		240
Glu Leu Phe Glu Arg Tyr Gly Thr Gln Gln Asn Gln Thr Asn Val Lys		
65 70 75 80		
gat aaa tta gat cca gct gag tat gaa gct ttg ctt aaa gga ggc gaa		288
Asp Lys Leu Asp Pro Ala Glu Tyr Glu Ala Leu Leu Lys Gly Gly Glu		
85 90 95		
caa gtg aca tcc gtt ctt gaa gaa atg att acc ctc ttg gaa gat atg		336
Gln Val Thr Ser Val Leu Glu Glu Met Ile Thr Leu Leu Glu Asp Met		
100 105 110		
aag atg aat gaa gca tct gag aat gtt gct gta gaa ttg gct gca caa		384
Lys Met Asn Glu Ala Ser Glu Asn Val Ala Val Glu Leu Ala Ala Gln		
115 120 125		
gga gtt ata ggg aaa agg gtc gat gaa atg gaa tca ggg ttt atg atg		432
Gly Val Ile Gly Lys Arg Val Asp Glu Met Glu Ser Gly Phe Met Met		
130 135 140		

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acc ccg aaa aag gaa agt aga cat gag ctt ctg cgt agg gtg gct gca Thr Pro Lys Lys Glu Ser Arg His Glu Leu Leu Arg Arg Val Ala Ala 195 200 205	624
ggg ggt ggg gct ttt gaa agt gag aac ggt act aaa ctt cat ata ccc Gly Gly Gly Ala Phe Glu Ser Glu Asn Gly Thr Lys Leu His Ile Pro 210 215 220	672
gga gca aat ctg aat gac ata gct aat caa gct gat gac ttg cta gag Gly Ala Asn Leu Asn Asp Ile Ala Asn Gln Ala Asp Asp Leu Leu Glu 225 230 235 240	720
act atg gaa aca agg cca gct att ccg gat cga aaa cta cta gcg agg Thr Met Glu Thr Arg Pro Ala Ile Pro Asp Arg Lys Leu Leu Ala Arg 245 250 255	768
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cag cag atg atc cag aat gta atg caa ggg aaa gat gaa ggc gca gat Gln Gln Met Ile Gln Asn Val Met Gln Gly Lys Asp Glu Gly Ala Asp 305 310 315 320	960
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gga tta aaa gga agg gga agc gtt aca gga aga aaa ccg tta cca gta Gly Leu Lys Gly Arg Gly Ser Val Thr Gly Arg Lys Pro Leu Pro Val 340 345 350	1056
aga cca gga atg ttt cta gaa act gtc aca aag gta ctg gga agt ata Arg Pro Gly Met Phe Leu Glu Thr Val Thr Lys Val Leu Gly Ser Ile 355 360 365	1104
tac tcg ggt aat gcc tcc ggg ata aca gca caa cat cta gaa tgg gtt Tyr Ser Gly Asn Ala Ser Gly Ile Thr Ala Gln His Leu Glu Trp Val 370 375 380	1152
cac caa aaa acc ctc caa gtt ctt gaa gaa atc gct tat tag His Gln Lys Thr Leu Gln Val Leu Glu Glu Ile Ala Tyr	1194

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<213> *Arabidopsis thaliana*

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35 40 45Val Gln Phe Cys Ala Pro Tyr Glu Val Gly Gly Tyr Thr Asp Glu
50 55 60Glu Leu Phe Glu Arg Tyr Gly Thr Gln Gln Asn Gln Thr Asn Val Lys
65 70 75 80Asp Lys Leu Asp Pro Ala Glu Tyr Glu Ala Leu Leu Lys Gly Gly Glu
85 90 95Gln Val Thr Ser Val Leu Glu Glu Met Ile Thr Leu Leu Glu Asp Met
100 105 110Lys Met Asn Glu Ala Ser Glu Asn Val Ala Val Glu Leu Ala Ala Gln
115 120 125Gly Val Ile Gly Lys Arg Val Asp Glu Met Glu Ser Gly Phe Met Met
130 135 140Ala Leu Asp Tyr Met Ile Gln Leu Ala Asp Lys Asp Gln Asp Glu Lys
145 150 155 160Arg Lys Ser Leu Leu Glu Val Val Lys Glu Thr Val Leu Ser His Leu
165 170 175Thr Lys Lys Cys Pro Pro His Val Gln Val Ile Gly Leu Leu Cys Arg
180 185 190

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Thr Pro Lys Lys Glu Ser Arg His Glu Leu Leu Arg Arg Val Ala Ala
195 200 205

Gly Gly Gly Ala Phe Glu Ser Glu Asn Gly Thr Lys Leu His Ile Pro
210 215 220

Gly Ala Asn Leu Asn Asp Ile Ala Asn Gln Ala Asp Asp Leu Leu Glu
225 230 235 240

Thr Met Glu Thr Arg Pro Ala Ile Pro Asp Arg Lys Leu Leu Ala Arg
245 250 255

Leu Val Leu Ile Arg Glu Glu Ala Arg Asn Met Met Gly Gly Ile
260 265 270

Leu Asp Glu Arg Asn Asp Arg Gly Phe Thr Thr Leu Pro Glu Ser Glu
275 280 285

Val Asn Phe Leu Ala Lys Leu Val Ala Leu Lys Pro Gly Lys Thr Val
290 295 300

Gln Gln Met Ile Gln Asn Val Met Gln Gly Lys Asp Glu Gly Ala Asp
305 310 315 320

Asn Leu Ser Lys Glu Ser Asp Ser Ser Thr Glu Gly Arg Lys Pro Ser
325 330 335

Gly Leu Lys Gly Arg Gly Ser Val Thr Gly Arg Lys Pro Leu Pro Val
340 345 350

Arg Pro Gly Met Phe Leu Glu Thr Val Thr Lys Val Leu Gly Ser Ile
355 360 365

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370 375 380

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 35 40 45

gat gtt cac aca ctt ttc aga tat tgc act aat ttg caa tca gcc aaa 192
 Asp Val His Thr Leu Phe Arg Tyr Cys Thr Asn Leu Gln Ser Ala Lys
 50 55 60

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 Cys Leu His Ala Arg Leu Val Val Ser Lys Gln Ile Gln Asn Val Cys
 65 70 75 80

atc tct gct aaa ctt gtt aat ctc tat tgt tac ctt ggc aat gtc gca 288
Ile Ser Ala Lys Leu Val Asn Leu Tyr Cys Tyr Leu Gly Asn Val Ala
85 90 95

ttg gct agg cac acg ttt gat cat atc cag aac aga gat gta tac gct 336
 Leu Ala Arg His Thr Phe Asp His Ile Gln Asn Arg Asp Val Tyr Ala
 100 105 110

tgg aat ttg atg att tct ggt tat ggc cgt gcg gga aat tct tca gaa 384
 Trp Asn Leu Met Ile Ser Gly Tyr Gly Arg Ala Gly Asn Ser Ser Glu
 115 120 125

gtg att agg tgt ttt agt ctc ttt atg ttg agt tct gga ctt aca cct 432
 Val Ile Arg Cys Phe Ser Leu Phe Met Leu Ser Ser Gly Leu Thr Pro
 120 125 130 135 140

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 Asp Tyr Arg Thr Phe Pro Ser Val Leu Lys Ala Cys Arg Thr Val Ile
 150 150 155 155 160

gat ggg aat aag att cat tgc ttg gct ttg aag ttt ggg ttt atg tgg
 Asp Gly Asn Lys Ile His Cys Leu Ala Leu Lys Phe Gly Phe Met Trp

gat gtc tat gtt gct gcc tcg ttg att cat ttg tac tct cga tat aaa 576
Asp Val Tyr Val Ala Ala Ser Leu Ile His Leu Tyr Ser Arg Tyr Lys

gct gtg ggg aat gca cgt ata ctg ttt gat gaa atg cct gta aga gat 624
Ala Val Gly Asn Ala Arg Ile Leu Phe Asp Glu Met Pro Val Arg Asp

atg ggt tct tgg aat gca atg att tct ggg tat tgt caa agc gga aat 672

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225						230				235					240		
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Val	Thr	Val	Val	Ser	Leu	Leu	Ser	Ala	Cys	Thr	Glu	Ala	Gly	Asp	Phe		
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Gly	Arg	Leu	Arg	Asp	Cys	Gln	Lys	Val	Phe	Asp	Arg	Met	Tyr	Tyr	Val	Arg	
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Asp	Leu	Ile	Ser	Trp	Asn	Ser	Ile	Ile	Lys	Ala	Tyr	Glu	Leu	Asn	Glu		
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Ile	Met	Glu	Glu	Gly	Glu	Ile	Ala	Ala	Asn	Gln	Gly	Thr	Trp	Val			
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Trp	Asn	Thr	Leu	Ile	Ala	Cys	His	Gly	Phe	His	Gly	His	Gly	Glu	Lys			
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gca	gtg	atg	ctg	ttc	aaa	gaa	atg	ctg	gat	gaa	gga	gtg	aag	cca	gat	1632		
Ala	Val	Met	Leu	Phe	Lys	Glu	Met	Leu	Asp	Glu	Gly	Val	Lys	Pro	Asp			
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cac	att	aca	ttt	gtg	act	ctg	tta	tcg	gct	tgt	agc	cat	tct	ggg	tta	1680		
His	Ile	Thr	Phe	Val	Thr	Leu	Leu	Ser	Ala	Cys	Ser	His	Ser	Gly	Leu			
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gta	gac	gag	ggt	caa	tgg	tgc	ttt	gag	atg	atg	caa	acg	gat	tat	ggg	1728		
Val	Asp	Glu	Gly	Gln	Trp	Cys	Phe	Glu	Met	Met	Gln	Thr	Asp	Tyr	Gly			
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600

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Gly Ser Asp Ala Ala Thr Ala Met Gly Ala Glu Ala Ala Val Tyr Ala
385 390 395 400

Ala Glu Ala Ser Asp Ala Asn Asp Leu Leu Glu Arg Ile Leu Pro Ala
405 410 415

Thr Val Ser Asp Tyr Val Asp Leu Val Lys Ala His Ile Glu Ala Gly
420 425 430

Pro Asn His His Phe Ala Ser Arg Gln Leu Leu Leu Leu Gly Thr Met
435 440 445

Leu Asp Phe Ser Asp Ala Met Leu His Lys Thr Val Ser Ser Phe Val
450 455 460

Gln Glu Leu Leu Arg Arg Pro Phe Glu Gln Glu Leu Asp Glu Asp Gly
465 470 475 480

Asn Ser Ile Val Ile Gly Asp Gly Ile Asn Leu Gly Gly Asp Lys Asp
485 490 495

Trp Ala Glu Ala Val Ser Lys Leu Ala Lys Lys Val His Ala Ala Pro
500 505 510

Gly Glu Tyr Glu Glu Val Ile Leu Val Val Val Glu Glu Val Ala Arg
515 520 525

Pro Cys Arg Glu Arg Thr Ala Asp Phe Leu Gln Trp Met His Met Leu
530 535 540

Ser Leu Thr Ser Leu Leu Leu Glu Asn Gly Lys Ser Leu His Ser Leu
545 550 555 560

Gln Gly Lys Ala Ile Glu Pro Glu Glu Ile Leu His Ala Leu Leu Leu
565 570 575

Pro Gly Ala Lys His Thr His Leu Asp Val Gln Arg Ile Ala Ile Lys
580 585 590

Gly Leu Gly Leu Phe Gly Leu Leu Glu Lys Lys Pro Ser Glu Glu Leu
595 600 605

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Val Arg Gln Leu Arg Ala Ala Phe Cys Arg Ser Pro Pro Pro Ile Ser
610 615 620

Ile Met Ala Cys Lys Ala Leu Val Asp Leu Gly Met Trp His Ser Pro
625 630 635 640

Thr Glu Val Asp Lys Ala Met Gly Gln Asp Leu Leu Ser Gln Phe Glu
645 650 655

Asp Asp Ser Ile Asp Phe Ala Pro Ile Asp Leu Ser Asn Ala Glu Glu
660 665 670

Asp Met Asn Phe Lys Met Leu Asp Leu Leu Tyr Ala Gly Leu Glu Ser
675 680 685

Asp Asp Trp Arg Ala Ser Thr Glu Ser Ser Glu Asn Glu Ser Val Lys
690 695 700

Ala Thr Val Gly Glu Gly Phe Ala Lys Leu Leu Leu Gly Glu Lys
705 710 715 720

Tyr Pro Asn Leu Pro Ala Ser Phe Tyr Pro Phe Val Leu Gly Lys Leu
725 730 735

Ile Ala Leu Tyr Phe Ser Glu Glu Ser Lys Glu Gln Leu Arg Phe Lys
740 745 750

Gln Cys Leu Ser Val Phe Phe Glu His Tyr Ala Ser Leu Ser Glu Lys
755 760 765

His Lys Gly Tyr Val Ser Lys Ala Phe Val Pro Leu Val Arg Ser Met
770 775 780

Trp Pro Gly Ile Asp Gly Asn Thr Lys Ser Ser Ser Tyr Val Val Ser
785 790 795 800

Asn Gln Arg Lys Arg Ala Val Gln Val Ser Arg Phe Ile Leu Gln Met
805 810 815

Met Gln Thr Pro Leu Tyr Lys Lys Glu Thr Arg Gly Glu Pro Glu Ser
820 825 830

Gln Val Asn Lys Ser Pro Glu Asp Ser Ile Gln His Pro Leu Asn Cys
835 840 845

Thr Glu Glu Gly Leu Ala Ile Arg Ile Ala Ile Glu Met Leu Ser Phe
850 855 860

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Lys Glu Lys Lys Thr Ala His Glu Ala Tyr Val Ala Ala Leu Cys
865 870 875 880

Lys Ile Leu Val Leu Leu His Leu Lys Pro Ser Glu Gln Asn Val Thr
885 890 895

Lys Leu Leu Lys Lys Leu Leu Ser Leu Leu Ala Asp Ser Val Arg Ser
900 905 910

Glu Lys Asp Leu Leu Lys Glu Val Lys Pro Val Leu Gln His Leu Lys
915 920 925

Ser Leu Asp Ala Cys Pro Ser Glu Glu Leu Thr Gln Asp Gln Ala Asn
930 935 940

Ser Ile Phe Glu Ile Leu Gly Val Ser Tyr Asn Leu Glu Ile Thr Glu
945 950 955 960

Thr Thr Thr Val Pro Gln Thr Pro Ala Pro Cys Ser Thr Lys Pro Ala
965 970 975

Arg Ser Arg Arg Arg Ala Arg Ile Glu Glu Thr Ser Ser Asp Glu Glu
980 985 990

Glu Val Ala Ser Pro Pro Ser Ala Pro Asn Thr Leu Met Thr Arg
995 1000 1005

Ser His Arg Ala Ser Lys Ala Ala Ala Leu Ala Lys Ile Met Ala
1010 1015 1020

Ser Lys Val Lys Met Ser Asn Val Asp Glu Asp Asp Glu Glu Glu
1025 1030 1035

Glu Gly Ser Ser Asp Val Thr Ala Asp Asp Ser Asp Glu
1040 1045 1050

<210> 47

<211> 1695

<212> DNA

<213> *Arabidopsis thaliana*

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<221> CDS

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<222> (1)..(1695)

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<400> 47		
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Met Val Phe Ser Asn Ser Leu Leu Ser Ser Thr Thr Ser Leu Thr Thr		
1 5 10 15		
tgg gca aat caa tca agt tct cag tca agt ctt tcc ccg aga tat tcg	96	
Trp Ala Asn Gln Ser Ser Gln Ser Ser Leu Ser Pro Arg Tyr Ser		
20 25 30		
aca tgg cag tgt gtt tgt tta cgt aat cag aaa cgc aaa cct aag ctc	144	
Thr Trp Gln Cys Val Cys Leu Arg Asn Gln Lys Arg Lys Pro Lys Leu		
35 40 45		
tac ttg att ccc gct cgc cat ttt tta tcg act cca att gat tca gtc	192	
Tyr Leu Ile Pro Ala Arg His Phe Leu Ser Thr Pro Ile Asp Ser Val		
50 55 60		
tcc tcc tcc tca ata acg gct tca cgt tat gct act tct ggc gtt tct	240	
Ser Ser Ser Ile Thr Ala Ser Arg Tyr Ala Thr Ser Gly Val Ser		
65 70 75 80		
gaa gtt caa agg tct act tcg agc aac aat gtt act gag atg gaa gag	288	
Glu Val Gln Arg Ser Thr Ser Asn Asn Val Thr Glu Met Glu Glu		
85 90 95		
ttt gag atg gag ttg caa gag ttg ttt aat gaa gtc aaa agt atg gtg	336	
Phe Glu Met Glu Leu Gln Glu Leu Phe Asn Glu Val Lys Ser Met Val		
100 105 110		
aag att ggg aag gaa agt gac gca atg gac ctt ctt cga gcg aat tat	384	
Lys Ile Gly Lys Glu Ser Asp Ala Met Asp Leu Leu Arg Ala Asn Tyr		
115 120 125		
gtt gct gtg aaa gaa gag ctg gat tcg ggt ttg aaa ggt atc gaa caa	432	
Val Ala Val Lys Glu Glu Leu Asp Ser Gly Leu Lys Gly Ile Glu Gln		
130 135 140		
gct gct gtt ctt gac atc att gct ttg ggg tat atg gct gtt gga gac	480	
Ala Ala Val Leu Asp Ile Ile Ala Leu Gly Tyr Met Ala Val Gly Asp		
145 150 155 160		
ttg aaa cct gtc ccc gca ttg ctt gat atg ata aac aag att gtt gat	528	
Leu Lys Pro Val Pro Ala Leu Leu Asp Met Ile Asn Lys Ile Val Asp		
165 170 175		
aat tta aaa gac tcc gaa cct ctt ttg gat tca gta ctt atg cat gtt	576	
Asn Leu Lys Asp Ser Glu Pro Leu Leu Asp Ser Val Leu Met His Val		
180 185 190		
ggc agt atg tat tcg gta ata ggg aag ttt gaa aac gct ata ctc gtg	624	
Gly Ser Met Tyr Ser Val Ile Gly Lys Phe Glu Asn Ala Ile Leu Val		
195 200 205		
cat caa agg gct att cgt ata tta gag aat aga tat ggt aaa tgc aat	672	
His Gln Arg Ala Ile Arg Ile Leu Glu Asn Arg Tyr Gly Lys Cys Asn		
210 215 220		

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act tta ctt gtc aca cca tta ctt ggt atg gct aag agt ttt gct tct Thr Leu Leu Val Thr Pro Leu Leu Gly Met Ala Lys Ser Phe Ala Ser 225 230 235 240	720
gat gga aaa gcc act aaa gcg att ggt gtt tat gag cgt acg ttg act Asp Gly Lys Ala Thr Lys Ala Ile Gly Val Tyr Glu Arg Thr Leu Thr 245 250 255	768
atc tta gaa cgg aat aga ggt tct gag agt gag gat cta gta gtt ccg Ile Leu Glu Arg Asn Arg Gly Ser Glu Ser Glu Asp Leu Val Val Pro 260 265 270	816
tta ttt tca ctc ggt aaa ctt ctg ctc aaa gaa ggt aaa gct gct gaa Leu Phe Ser Leu Gly Lys Leu Leu Lys Glu Gly Lys Ala Ala Glu 275 280 285	864
gca gaa att cct ttt acc agc att gta aat ata tac aag aag ata tac Ala Glu Ile Pro Phe Thr Ser Ile Val Asn Ile Tyr Lys Lys Ile Tyr 290 295 300	912
gga gag aga gat gga aga gtt ggc atg gcc atg tgt tcc ctt gct aat Gly Glu Arg Asp Gly Arg Val Gly Met Ala Met Cys Ser Leu Ala Asn 305 310 315 320	960
gct aag tgc tca aaa ggt gat gca aat gaa gct gtt gat atc tac agg Ala Lys Cys Ser Lys Gly Asp Ala Asn Glu Ala Val Asp Ile Tyr Arg 325 330 335	1008
aat gct cta cga ata atc aaa gac tca aat tat atg aca ata gac aac Asn Ala Leu Arg Ile Ile Lys Asp Ser Asn Tyr Met Thr Ile Asp Asn 340 345 350	1056
agt atc ttg gaa aac atg agg ata gat ctt gct gag ctg ctt cat ttc Ser Ile Leu Glu Asn Met Arg Ile Asp Leu Ala Glu Leu Leu His Phe 355 360 365	1104
gtt gga agg gga gat gaa gga cga gag tta cta gaa gaa tgc tta tta Val Gly Arg Gly Asp Glu Gly Arg Glu Leu Leu Glu Glu Cys Leu Leu 370 375 380	1152
ata aat gag aga ttc aaa ggg aaa aac cat cct agc atg gct aca cat Ile Asn Glu Arg Phe Lys Gly Lys Asn His Pro Ser Met Ala Thr His 385 390 395 400	1200
ctt ata aac ctt gca gca tct tat tcg cgt tcc aag aat tat gtg gag Leu Ile Asn Leu Ala Ala Ser Tyr Ser Arg Ser Lys Asn Tyr Val Glu 405 410 415	1248
gca gaa cga ttg cta cga act tgt ttg aac atc atg gag gta tca gtt Ala Glu Arg Leu Leu Arg Thr Cys Leu Asn Ile Met Glu Val Ser Val 420 425 430	1296
ggc tca gaa ggt cag tcc ata acc ttc cca atg cta aat ctt gca gtc Gly Ser Glu Gly Gln Ser Ile Thr Phe Pro Met Leu Asn Leu Ala Val 435 440 445	1344
act ctt tcc caa ctg aat cgt gat gag gaa gcc gag caa ata gcc tta Thr Leu Ser Gln Leu Asn Arg Asp Glu Glu Ala Glu Gln Ile Ala Leu 450 455 460	1392
aag gtt cta cgc atc cgt gag aag gca ttt ggc gaa gac tct ctc cct Lys Val Leu Arg Ile Arg Glu Lys Ala Phe Gly Glu Asp Ser Leu Pro	1440

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465	470	475	480	
gtt gga gag gcg ctg gac tgt ttg gta tcg atc caa gcg aga cta gga				1488
Val Gly Glu Ala Leu Asp Cys Leu Val Ser Ile Gln Ala Arg Leu Gly				
485	490	495		
aga gat gat gga gaa ata ttg ggt ttg ctg aaa agg gtt atg atg atc				1536
Arg Asp Asp Gly Glu Ile Leu Gly Leu Leu Lys Arg Val Met Met Ile				
500	505	510		
caa gag aaa gag ttt ggt cct tca gct caa gaa ctc att gtt act ctc				1584
Gln Glu Lys Glu Phe Gly Pro Ser Ala Gln Glu Leu Ile Val Thr Leu				
515	520	525		
cag aag atc att cat ttc ttg gag aaa ttg gag atg aaa gat gat aaa				1632
Gln Lys Ile Ile His Phe Leu Glu Lys Leu Glu Met Lys Asp Asp Lys				
530	535	540		
ttt aag ttt agg aga aga tta gct tta ctt aga gag aga tac aag cag				1680
Phe Lys Phe Arg Arg Arg Leu Ala Leu Leu Arg Glu Arg Tyr Lys Gln				
545	550	555	560	
agt ctt agc tac tag				1695
Ser Leu Ser Tyr				

<210> 48

<211> 564

<212> PRT

<213> *Arabidopsis thaliana*

<400> 48

Met Val Phe Ser Asn Ser Leu Leu Ser Ser Thr Thr Ser Leu Thr Thr
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Trp Ala Asn Gln Ser Ser Ser Gln Ser Ser Leu Ser Pro Arg Tyr Ser
 20 25 30

Thr Trp Gln Cys Val Cys Leu Arg Asn Gln Lys Arg Lys Pro Lys Leu
 35 40 45

Tyr Leu Ile Pro Ala Arg His Phe Leu Ser Thr Pro Ile Asp Ser Val
 50 55 60

Ser Ser Ser Ser Ile Thr Ala Ser Arg Tyr Ala Thr Ser Gly Val Ser
 65 70 75 80

Glu Val Gln Arg Ser Thr Ser Ser Asn Asn Val Thr Glu Met Glu Glu
 85 90 95

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Phe Glu Met Glu Leu Gln Glu Leu Phe Asn Glu Val Lys Ser Met Val
100 105 110

Lys Ile Gly Lys Glu Ser Asp Ala Met Asp Leu Leu Arg Ala Asn Tyr
115 120 125

Val Ala Val Lys Glu Glu Leu Asp Ser Gly Leu Lys Gly Ile Glu Gln
130 135 140

Ala Ala Val Leu Asp Ile Ile Ala Leu Gly Tyr Met Ala Val Gly Asp
145 150 155 160

Leu Lys Pro Val Pro Ala Leu Leu Asp Met Ile Asn Lys Ile Val Asp
165 170 175

Asn Leu Lys Asp Ser Glu Pro Leu Leu Asp Ser Val Leu Met His Val
180 185 190

Gly Ser Met Tyr Ser Val Ile Gly Lys Phe Glu Asn Ala Ile Leu Val
195 200 205

His Gln Arg Ala Ile Arg Ile Leu Glu Asn Arg Tyr Gly Lys Cys Asn
210 215 220

Thr Leu Leu Val Thr Pro Leu Leu Gly Met Ala Lys Ser Phe Ala Ser
225 230 235 240

Asp Gly Lys Ala Thr Lys Ala Ile Gly Val Tyr Glu Arg Thr Leu Thr
245 250 255

Ile Leu Glu Arg Asn Arg Gly Ser Glu Ser Glu Asp Leu Val Val Pro
260 265 270

Leu Phe Ser Leu Gly Lys Leu Leu Leu Lys Glu Gly Lys Ala Ala Glu
275 280 285

Ala Glu Ile Pro Phe Thr Ser Ile Val Asn Ile Tyr Lys Lys Ile Tyr
290 295 300

Gly Glu Arg Asp Gly Arg Val Gly Met Ala Met Cys Ser Leu Ala Asn
305 310 315 320

Ala Lys Cys Ser Lys Gly Asp Ala Asn Glu Ala Val Asp Ile Tyr Arg
325 330 335

Asn Ala Leu Arg Ile Ile Lys Asp Ser Asn Tyr Met Thr Ile Asp Asn
340 345 350

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Ser Ile Leu Glu Asn Met Arg Ile Asp Leu Ala Glu Leu Leu His Phe
355 360 365

Val Gly Arg Gly Asp Glu Gly Arg Glu Leu Leu Glu Glu Cys Leu Leu
370 375 380

Ile Asn Glu Arg Phe Lys Gly Lys Asn His Pro Ser Met Ala Thr His
385 390 395 400

Leu Ile Asn Leu Ala Ala Ser Tyr Ser Arg Ser Lys Asn Tyr Val Glu
405 410 415

Ala Glu Arg Leu Leu Arg Thr Cys Leu Asn Ile Met Glu Val Ser Val
420 425 430

Gly Ser Glu Gly Gln Ser Ile Thr Phe Pro Met Leu Asn Leu Ala Val
435 440 445

Thr Leu Ser Gln Leu Asn Arg Asp Glu Glu Ala Glu Gln Ile Ala Leu
450 455 460

Lys Val Leu Arg Ile Arg Glu Lys Ala Phe Gly Glu Asp Ser Leu Pro
465 470 475 480

Val Gly Glu Ala Leu Asp Cys Leu Val Ser Ile Gln Ala Arg Leu Gly
485 490 495

Arg Asp Asp Gly Glu Ile Leu Gly Leu Leu Lys Arg Val Met Met Ile
500 505 510

Gln Glu Lys Glu Phe Gly Pro Ser Ala Gln Glu Leu Ile Val Thr Leu
515 520 525

Gln Lys Ile Ile His Phe Leu Glu Lys Leu Glu Met Lys Asp Asp Lys
530 535 540

Phe Lys Phe Arg Arg Arg Leu Ala Leu Leu Arg Glu Arg Tyr Lys Gln
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Ser Leu Ser Tyr

<210> 49

<211> 18

<212> DNA

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<222> (1)..(18)

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<223> n=a, t, g or c

<400> 49

ngttgwgnat wtsgwgnt

18

<210> 50

<211> 16

<212> DNA

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<222> (1)..(16)

<223> n=a, t, g or c

<400> 50
ngtcgaswga nawgaa

16

<210> 51
<211> 16
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<223> n=a, t, g or c

<400> 51
tgwgnagsan casaga

16

<210> 52
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<222> (1)..(16)

<223> n= a, t, g or c

<400> 52

agwgnagwan cawagg

16

<210> 53

<211> 16

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<223> n=a, t, g, or c

<400> 53

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16

<210> 54

<211> 15

<212> DNA

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<222> (1)..(15)

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<222> (1)..(15)

<223> n=a, t, g or c

<400> 54

ntcgastwts gwgtt

15

<210> 55

<211> 16

<212> DNA

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<222> (1)..(16)

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<223> n=a, t, g or c

<400> 55

wgtgnagwan canaga

16

<210> 56

<211> 30

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<212> DNA

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<220>

<223> primer

<220>

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<222> (1)..(30)

<223>

<400> 56

actagctcta ccgttccgt ttccgtttac

30

<210> 57

<211> 30

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(30)

<223>

<400> 57

ttacacctggg ttcgaaatcg atcggataa

30

<210> 58

<211> 33

<212> DNA

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<220>

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<223> primer

<220>

<221> misc_feature

<222> (1)..(33)

<223>

<400> 58

aaaatcggtt atacgataac ggtcggtacg gga

33

<210> 59

<211> 36

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(36)

<223>

<400> 59

gggtcttgcg gatctgaata tatgtttca tgtgtg

36

<210> 60

<211> 37

<212> DNA

<213> artificial sequence

<220>

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<222> (1)..(37)

<223>

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<400> 60 taccgaagaa aaataccgggt tcccgtccga ·tttcgac 37

<210> 61

<211> 34

<212> DNA

<213> artificial sequence

<220>

<223> primer

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<221> misc_feature

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<223>

<400> 61

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<210> 62

<211> 29

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<221> misc_feature

<222> (1)..(29)

<223>

<400> 62

ataggcacc ccaggcttta cactttatg

29

<210> 63

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<211> 30

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(30)

<223>

<400> 63

gtatgttgtg tgaaattgtg agcggataac

30

<210> 64

<211> 30

<212> DNA

<213> artificial sequence

<220>

<223> primer

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<222> (1)..(30)

<223>

<400> 64

taacaatttc acacaggaaa cagctatgac

30

<210> 65

<211> 34

<212> DNA

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<400> 65
tagcatctgat atttcataac caaatctcgat acac

34

<210> 66
<211> 34
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<222> (1)..(34)
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<400> 66
gcttcctatt atatcttccc aaattaccaa taca

34

<210> 67
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<221> misc_feature

<222> (1)..(34)

<223>

<400> 67

gcctttcag aaatggataa atagccttgc ttcc

34

<210> 68

<211> 32

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(32)

<223>

<400> 68

caaacttagga taaattatcg cgcgcggtgt ca

32

<210> 69

<211> 32

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(32)

<223>

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<400> 69
ggtgtcatct atgttactag atcgggaatt ga 32

<210> 70

<211> 30

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(30)

<223>

<400> 70
cgccatggca tatgcttagca tgcataattc 30

<210> 71

<211> 35

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(35)

<223>

<400> 71
aattggtaat tacttttct ttccctccat attga 35

<210> 72

70166USNP.ST25

<211> 31

<212> DNA

<213> artificial sequence

<220>

<223> primer

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<221> misc_feature

<222> (1)..(31)

<223>

<400> 72

atattgacca tcatactcat tgcttgatcca t

31

<210> 73

<211> 28

<212> DNA

<213> artificial sequence

<220>

<223> primer

<220>

<221> misc_feature

<222> (1)..(28)

<223>

<400> 73

tgatccatgt agatttcccg gacatgaa

28